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Original Articles

ORTHODONTIC PROCEDURES IN GROSS DENTOFACIAL MALFORMATIONS

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A DENTOFACIAL malformation, a maxillofacial malformation, or an orofacial malformation is the same designation for an exceedingly distressing deformity of the teeth, mouth, and face. It involves deficiencies, distortions, and malarrangements of the oral, facial, and contiguous structures, with corresponding functional disharmonies.

The general facial contour is grotesque, resembling a caricature or a monstrosity. The crippling deformity is aggravated by the conspicuousness of the physiognomy, which undoubtedly produces a repulsive social response in others. Since such an individual realizes that the possibility of effectively disguising the malformation or of concealing it from view is very slight indeed, a psychic factor is created for unfavorable emotional reactions which must be reflected in the unfortunate's mental health and daily behavior.

A facial deformity may affect any age from neonatal life through adolescence, maturity, and old age. It may be inherited or acquired. It may be caused by or may be a sequel to trauma, disease, or neoplasms. It may be glandular in origin or the result of nutritional deficiencies. Whatever the cause, treatment requires over-all planning in which the various surgical, medical, and dental specialties contribute their respective skills and knowledge toward the correction of the deformity, restoration of function, and alleviation of the mental anguish of the facial cripple.

Read before the New York Society of Orthodontists, Nov. 5, 1946.

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In this presentation, I shall endeavor to describe the orthodontic procedures in gross dentofacial deformities, such as (1) cleft lip and cleft palate, (2) ankylosis of the temporomandibular articulation, and (3) the surgical correction of prognathous mandibles and their preoperative and postoperative care.

CLEFT LIP AND CLEFT PALATE

"The congenital cleft may be a simple division of the uvulae, or it may extend through the soft and hard palates as a fissure or opening frequently involving the alveolar process. Thus the roof of the mouth is not completely formed and a direct communication is present between the oral and nasal cavities. The cleft may extend forward through the lip, thereby dividing the lip into two parts if the cleft lip is unilateral or single, or into three parts, if it is bilateral or double. The congenital separation in the lip is commonly known as harelip.

"The clefts of the hard and soft palates are found in the median line, while the cleft of the lip corresponds to the line of suture of the premaxillary bones. If the cleft of the lip is unilateral, it is seen more frequently to the left than to the right of the median line. However, should the cleft be bilateral, the division will be in line with the premaxillary sutures on both sides of the median line.

"A cleft may be only of the uvulae, or of the soft palate, or of the soft and hard palates. It may involve the lip only, or lip and alveolar process, or it may be a combination of all these structures. The unfortunate newborn with a cleft lip and cleft palate deformity presents an unsightly gap in the face extending to the oropharynx."*

It is apparent from an aesthetic and functional viewpoint that such unfortunate infants must be helped as soon as possible. Surgery alone could repair the divided lip so as to unite the split segments into a continuous lip. That would not only improve the infant's appearance, but would aid it in sucking nourishment. However, before the infant can be operated upon, it must be on the upgrade physically. Definite weight gains would indicate that the feeding formula is adequate and that other bodily processes are functioning properly.

Feeding a cleft palate baby is a difficult task. Various appliances, including vulcanite and acrylic obturators, have been devised as feeding aids. I shall describe an acrylic obturator. Before doing so, I wish to emphasize that although any means of facilitating the feeding of the cleft palate infant is most desirable, it is primarily a nursing problem. In the light that an obturator is only a mechanical adjunct, I wish to report the following case:

CASE 1.—Infant, aged 6 weeks, had been born with a complete bilateral cleft of the lip and cleft of the hard and soft palates, with the premaxilla congenitally missing (Fig. 1*A*). On admission, the infant weighed 7 pounds, 10 ounces. Her weight fluctuated from 6 pounds, 2 ounces to 7 pounds, 6 ounces. The infant had excellent medical and nursing care; nevertheless, she did not gain consistently. It was decided to construct an obturator for any help it might give.

Trays were improvised and an impression of the divided maxillae was taken with low-heat modeling compound, at all times observing strict asepsis. From

*Orthodontics in the Treatment of Cleft Palate, Am. J. Orthodontics and Oral Surg., 27: 423-453, 1941.

this impression an artificial stone cast was poured. The cast showed vividly the divided hard and soft palates and the inferior nasal fossae (Fig. 1*C*). The nasal portion of the cleft was filled with artificial stone to the level of the median borders of the hard palate; thus the cleft was bridged over. It is my preference not to extend any bulk of material into the nasal cavity.

The cast was then waxed up similarly to the Hawley retainer, covering the entire palate almost to the oropharynx and slightly over the alveolar ridge. It was processed in acrylic and highly polished. The obturator, when completed, resembled a miniature denture minus teeth (Fig. 1*D* and *E*). Bearing

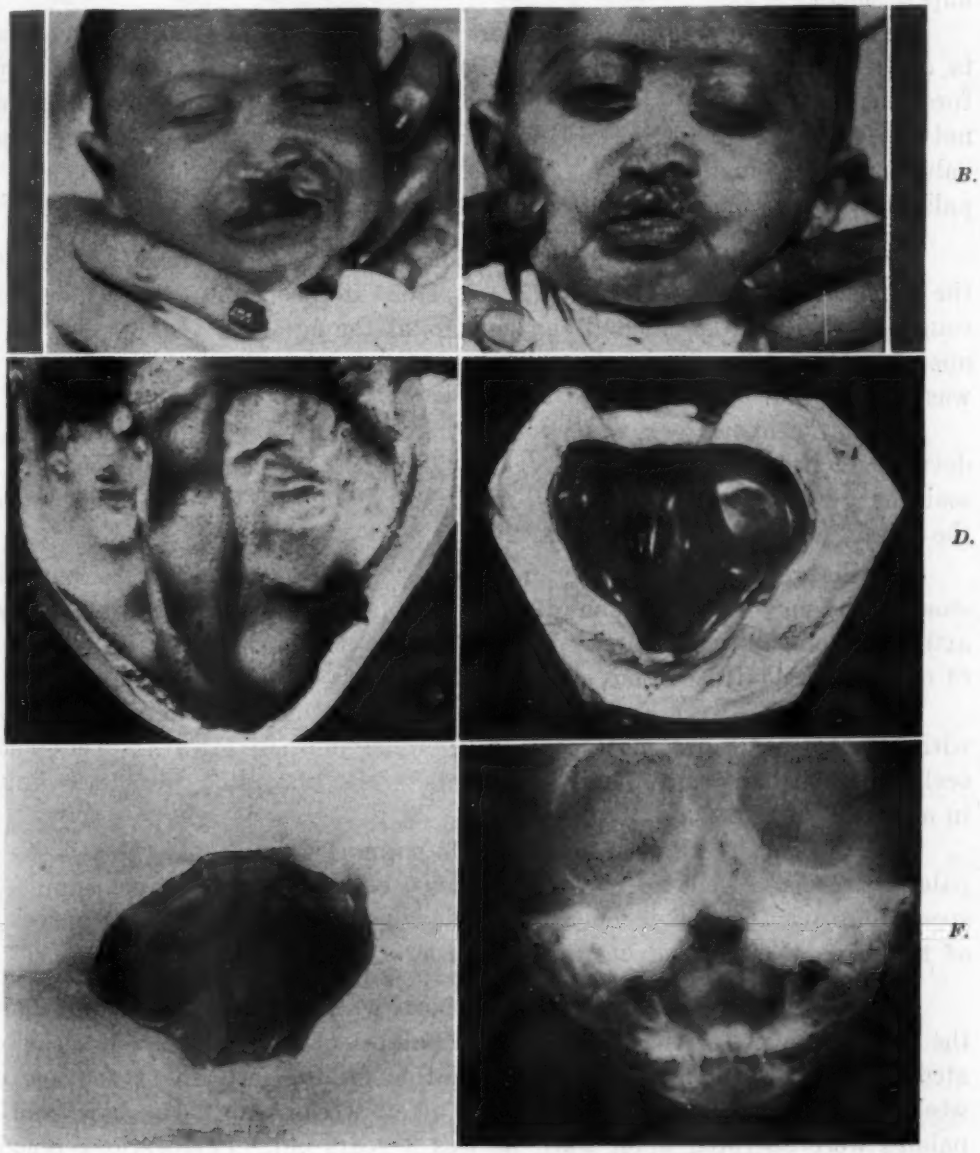


Fig. 1.—*A*, Infant with complete cleft of lip, hard and soft palates. Premaxilla congenitally absent. (Courtesy of Roland L. Maier, M.D.) *B*, Cleft lip repaired. (Courtesy of Roland L. Maier, M.D.) *C*, Cast of cleft palate. *D*, Obturator and velum, oral view. *E*, View of tissue side of appliance. *F*, Posteroanterior roentgenogram of infant at 9 weeks, confirming absence of premaxilla and revealing developing deciduous teeth.

in mind that teeth were in situ and developing (Fig. 1*F*), the obturator was inserted only a few minutes before feeding and was kept in position for only a short time after (until the baby bubbles). There was relatively no difficulty in feeding the infant, yet the formula was not retained. The condition was diagnosed as a pyloric stenosis. To relieve the stenosis, the infant was operated upon when she was 15 weeks old. Following that operation, the infant gained weight. The cleft lip was repaired surgically six weeks later (21 weeks old) (Fig. 1*B*). The baby now takes her food well. There is no doubt that the excellent nursing, medical, and surgical care were responsible for the baby's improvement.

After the lip operation and before the child learns to talk, it is desirable to close the hard and soft palates. Following the initial palatal repair, perforations may develop. Further surgical repair may not be indicated or may not be feasible at that time. However, an obturator may be of considerable value as a space maintainer, and at the same time it may mechanically seal the palatal openings and aid in speech training and mastication.

CASE 2.—Child, aged 4, had been born with a complete unilateral cleft of the lip, hard and soft palates (Fig. 2*A*). Her childhood illnesses were whooping cough when 6 months old and chicken pox at the age of 2 years. The lip was operated upon when she was 5 weeks old, the hard and soft palates when she was 3 years old.

After the operations, a perforation in the anterior region of the palate developed (Fig. 2*B* and *D*). The anterior maxillary teeth were missing. To seal the perforation mechanically, we constructed an obturator and replaced the missing deciduous teeth (Fig. 2*C*).

Maxillary and mandibular impressions were taken and were poured in stone. The maxillary cast showed the nasal perforation, which was filled with artificial stone to the palatal edges. Jackson crib clasps were constructed to fit over the second deciduous molars.

Acrylic teeth were shaped to resemble deciduous teeth, and were set up with anterior interproximal spaces to simulate normal growth spaces and to occlude with their mandibular opponents. The obturator was then finished in acrylic (Fig. 2*E*).

The presence of these teeth served to support the lip and aided in lip and palatal exercises, such as blowing balloons, etc. The lip became supple, her speech improved, and her general attitude showed recognition and appreciation of the advantage of wearing an obturator.

CASE 3.—Boy, 5 years of age, was born with a complete bilateral cleft of the lip and a cleft of the hard and soft palates (Fig. 3*A*). His lip was operated upon in two stages, the first operation on the left lip at the age of 5 weeks, and the second on the right side a few weeks later. His hard and soft palates were operated upon when he was 3 years old. Perforations remained in the palate in the region of the premaxillary sutures (Fig. 3*B*).

Maxillary and mandibular casts were made and prepared as in the previous case. An obturator, with labial flanges in the canine regions extending toward

the mucolabial fold, was constructed. The flanges built up the angles of the mouth, and teeth shaped like deciduous canines were added to occlude with the mandibular teeth. Jackson crib clasps on the second deciduous molars served for retention. The appliance was finished in acrylic. (Fig. 3*D* and *E*.)

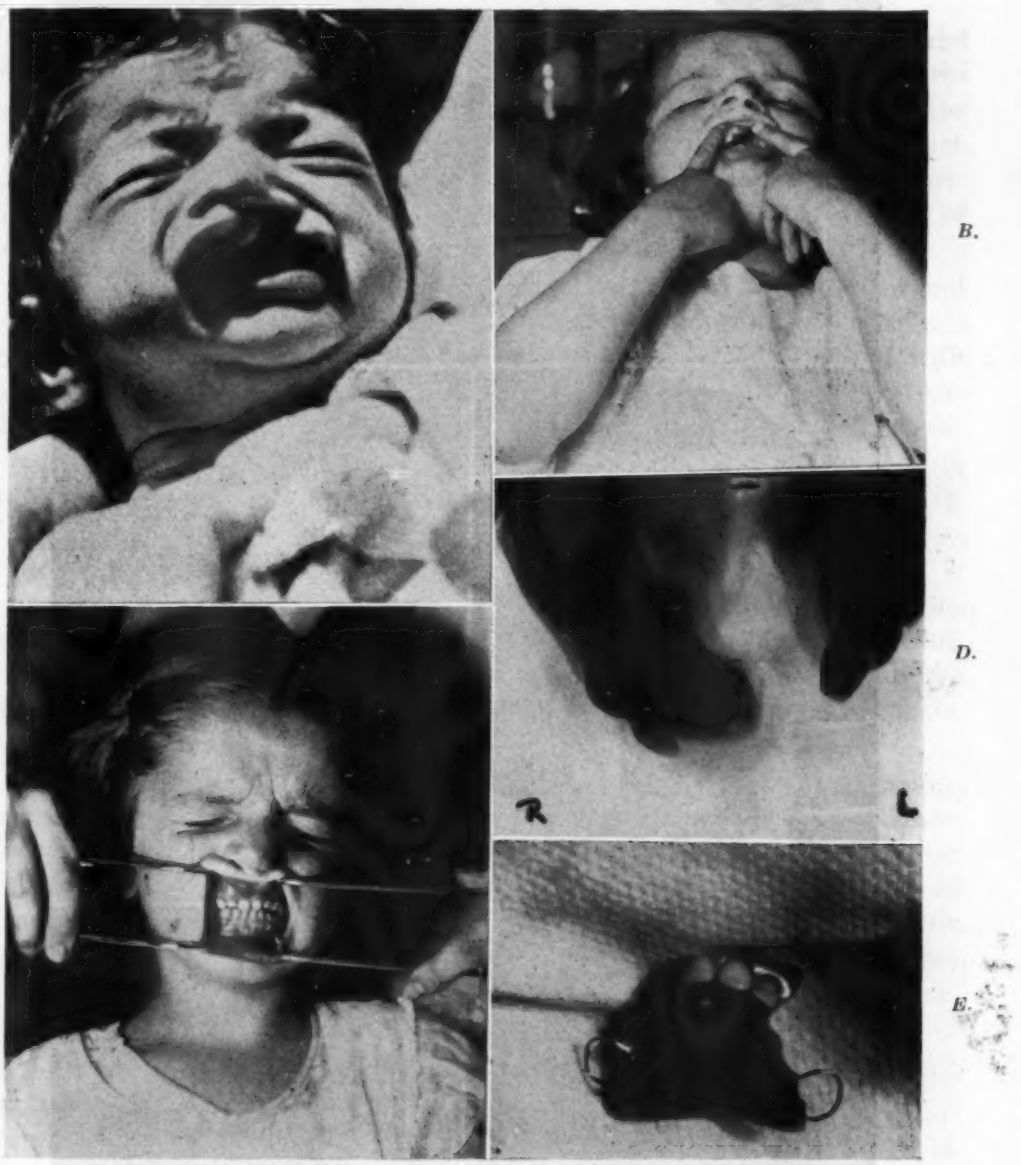


Fig. 2.—*A*, Unilateral cleft of lip and complete cleft of hard and soft palates. (Courtesy of the late Carl G. Burdick, M.D.) *B*, Mouth open showing anterior perforation in hard palate following cleft palate repair, aged 4 years. *C*, Occlusal view. Obturator containing anterior teeth in position. *D*, Occlusal roentgenogram showing cleft in hard palate. *E*, Photograph of obturator with labial flange, spaced anterior teeth (deciduous-shaped), and Jackson crib clasps.

The obturator served as a space maintainer, supplied missing teeth, built up the angles of the mouth, bridged over the oral perforations, improved his mastication, and helped a little in his speech (Fig. 3*C*).

The cleft lip and cleft palate may be complicated by the loss of the premaxilla due to sloughing or, as had been a former practice, it may have been removed, or, although rare, the premaxilla may be congenitally absent (Fig.

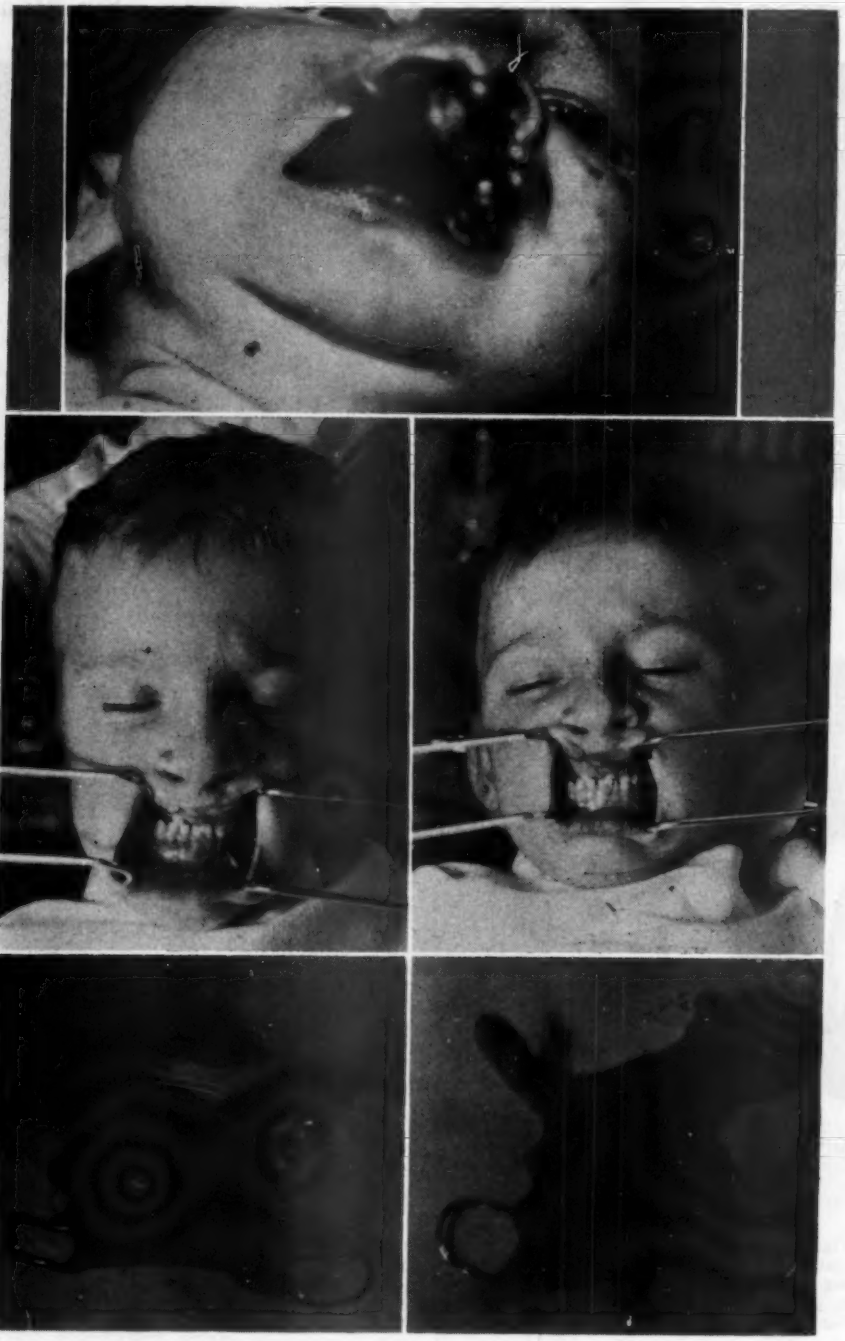


Fig. 3.—*A*, Bilateral cleft of lip and complete cleft of hard and soft palates. (Courtesy of the late Carl G. Burdick, M.D.) *B*, Occlusal view. Arrows indicate perforations persisting in the regions of the intermaxillary suture. *C*, Occlusal view with obturator in position. The labial flanges build up angles of the mouth, also act as space maintainers. *D*, Photograph of oral view of obturator with deciduous-shaped canine teeth and labial flanges. *E*, Tissue side view of obturator. Note there are no nasal extensions, only labial flanges.

1*A*). Thus the lip, lacking substance and bony support, will collapse. An Abbé plastic transplant from the mandibular lip to the maxillary lip will supply additional tissue bulk; nevertheless, subsequent revision may be necessary. In such instances, preoperative planning may be invaluable in providing a stent upon which to reconstruct the lip contour.

CASE 4.—Female, aged 15, was born with a bilateral cleft of the lip and cleft of the maxillary alveolar process. She was operated upon two months after birth, at which time the premaxilla and labial tissue sloughed. At the age of three, an Abbé transplant from the lower lip furnished the tissue which filled the upper lip defect (Fig. 4*A*, *B*, and *C*). At the age of 15 she presented a collapsed upper lip, unsupported by teeth or bone. The vermilion of her lip was uneven. Her lip required revision. (Fig. 4*D*, *E*, and *F*.)

Before the plastic repair, in cooperation with the surgeon, an obturator and a lower partial denture were planned. The nasal perforation in the cast was filled as before. The obturator containing anterior teeth was completed with a large flange extending to the mucolabial fold. The teeth occluded with corresponding mandibular artificial teeth so that her lips rested in proper repose The restorations were kept in the mouth during the initial revision of the lip. There was further plastic work, with a truly remarkable transformation. (Fig. 4, *G*, *H*, and *I*.)

The only method of uniting a cleft or split lip is through surgery. It is also the primary avenue of approach for the relief of the cleft palate. Unfortunately, not all surgical efforts toward that end are entirely successful. After many operations the soft palate may be very short and inflexible, or the closure may not have been achieved at all. The maxilla may be contracted, the maxillary arch narrowed.

In planning aid for these patients, the obturator and velum should supply missing teeth, and invariably should be combined with an orthodontic appliance. Suffice it to say that the appliance designs were not limited to any particular system of orthodontic practice, but advantage was taken of any method or combination of methods that offered the greatest range of combined orthodontic and prosthetic possibilities. Some combinations were described in my previous paper, "Orthodontics in the Treatment of Cleft Palate,"[8] and I shall not repeat them.

CASE 5.—Male, aged 17, was born with a complete unilateral cleft of the lip, hard and soft palates. He weighed 8 pounds 2 ounces at birth. His childhood illnesses were pneumonia at 3 months, measles and whooping cough at 2 years, and chicken pox at 2½ years.

His lip was operated upon at 3 weeks of age, with four additional lip operations reported to have followed. His palate was operated upon at the age of 6, and again subsequently.

He presented a badly mutilated mouth, with a pronounced mesioclusion, complicated by missing teeth (Fig. 5*E*). The left maxillary canine and right second incisor were in contact; the intervening teeth were missing. There was

considerable cicatricial tissue where the soft palate should have been. His mouth opening was extremely small (Fig. 5*A*).

After a careful study, we planned an obturator to seal the palatal perforations, a velum to supplement the insufficient length of the remaining soft

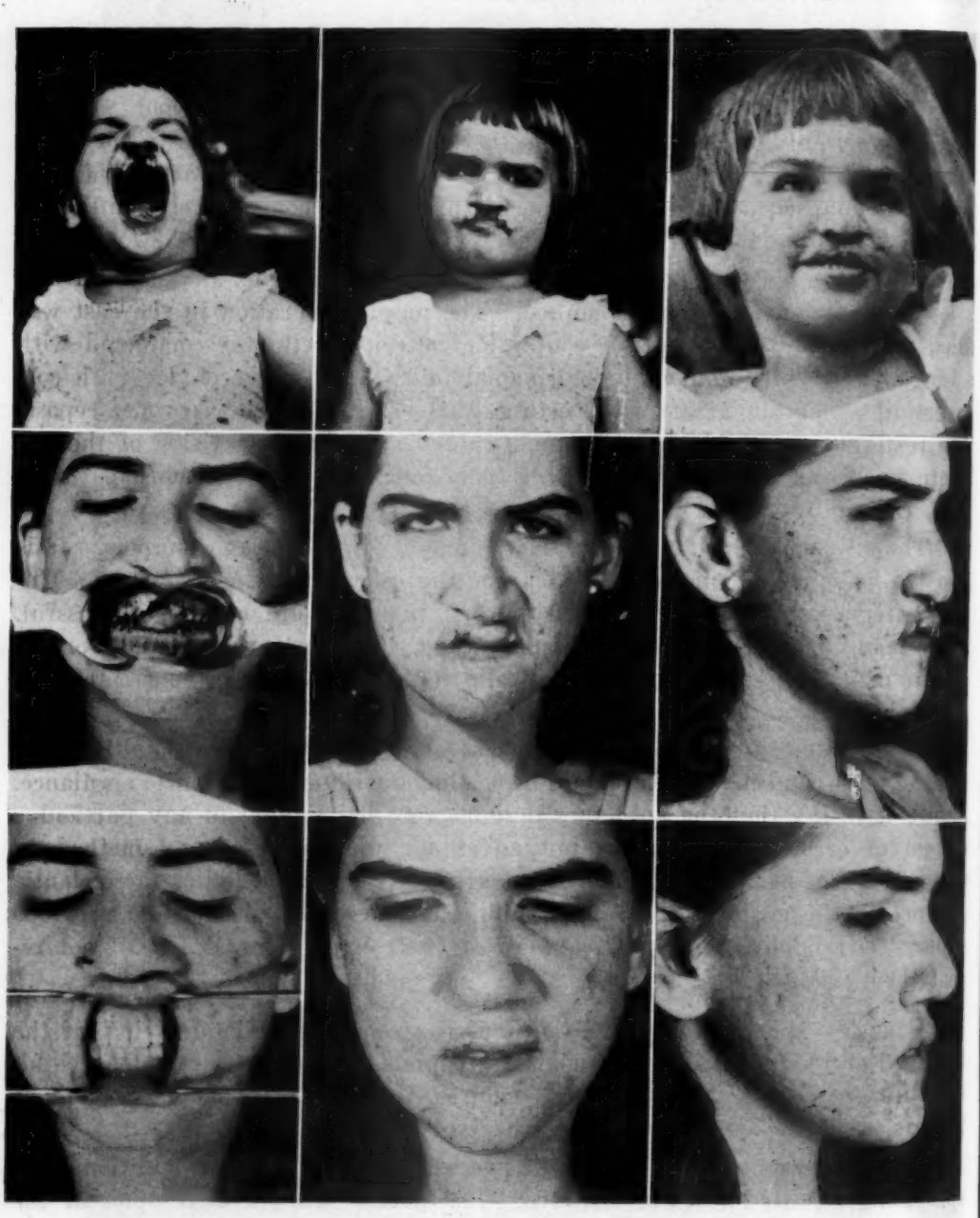


Fig. 4.—*A*, Oral view of bilateral cleft of the lip and alveolar process, aged 3 years. Premaxilla is missing. *B*, Front view, prolabium sloughed away, insufficient labial tissue. *C*, Front view after Abbé transplant. *D*, Occlusal view, aged 15 years. *E*, Front view before lip revision. *F*, Profile view before lip revision. *G*, Front view after plastic repair operations with the obturator (acting as stent) and mandibular restoration in position. *H*, Front view after lip revision and nasal reconstruction. *I*, Profile view after lip revision and nasal reconstruction by Yolande H. Huber, M.D.

palate, and provisions for an orthodontic appliance. In order to obtain a proper cast, it was necessary to construct a special tray. This was made from sectional impressions poured in plaster into a composite cast.

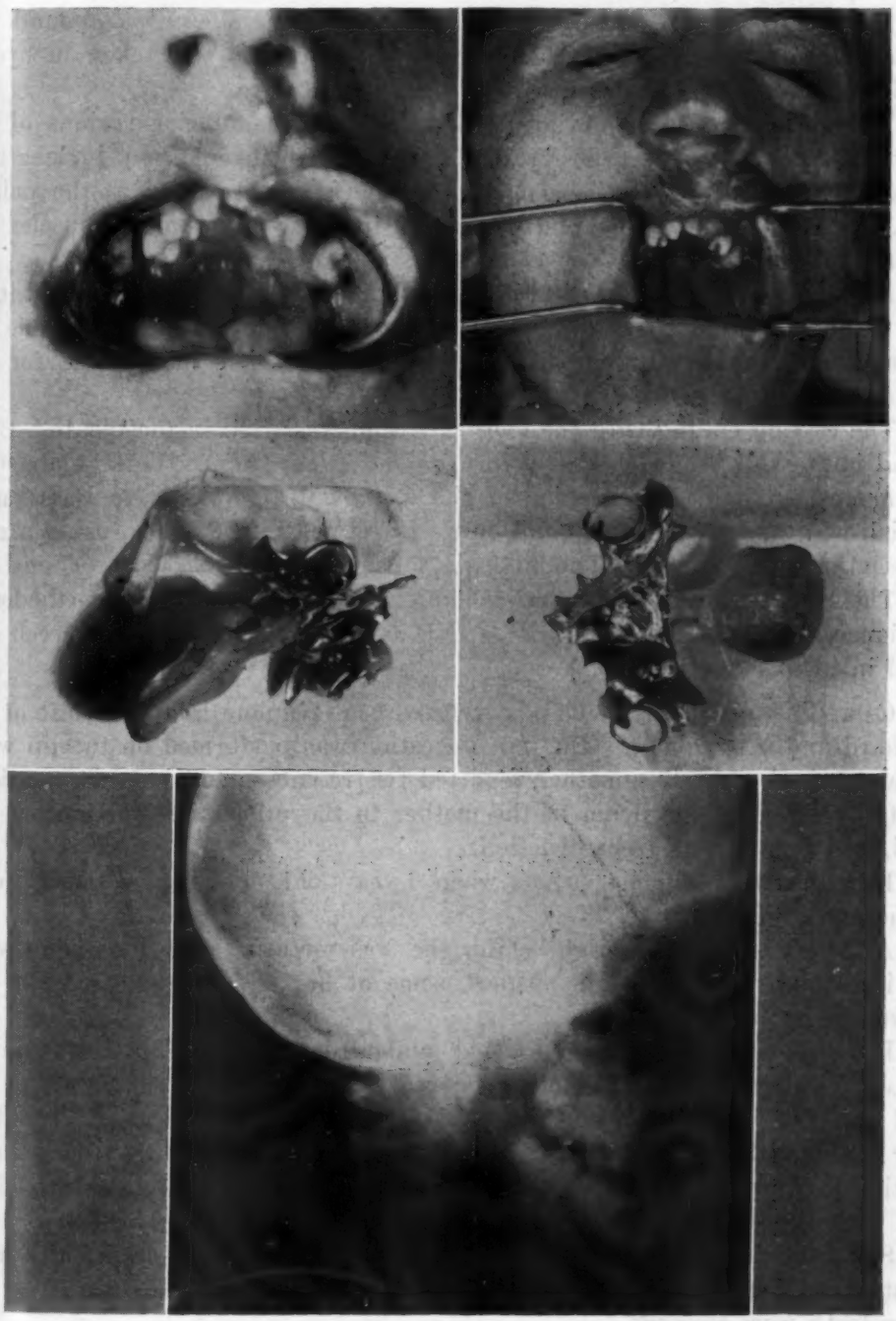


Fig. 5.—*A*, Oral view showing, grossly, inadequate soft palate terminating where soft palate normally begins. *B*, Oral view with obturator and velum supplementing deficient soft palate. *C*, Photograph of obturator and velum. Note 0.5 round tubes for orthodontic appliance. *D*, View of tissue side of appliance. *E*, Profile roentgenogram revealing lack of maxillary development aggravated by missing teeth.

Bands were constructed for the maxillary second molars and were cemented into place. The first molars were missing. Then from the previously constructed cast a tray was made. It was small and flat and capable of insertion, with impression material in it, into the mouth, and could be easily removed. The maxillary tray had a loop extension over which modeling compound was molded beyond the pillars of the fauces. An impression was taken in hydrocolloid material and poured immediately.

We now had a cast showing perforations in the anterior regions of the palate and a large opening posteriorly, indicating an insufficiency in length of the soft palate. The anterior openings in the cast were filled to the palatal level, but the posterior opening was not, since the soft palate muscles are sphincterlike in action.

A casting was made of vitallium, covering the entire hard palate with a loop extending posteriorly to hold the velum bulb, and clasps were made for the molars. One-half round tubes were soldered to the metal base for the orthodontic appliance.

The casting ending with the loop extension was tried in the mouth. Compound impression material was molded over the loop for the soft palate bulb, and a muscle-trimmed impression of the soft palate extending to Passavant's cushion was taken. The compound bulb was relined for accuracy, using a zinc-oxide impression material. The bulb was finished in acrylic. (Fig. 5*C* and *D*.)

The completed obturator and velum, with provisions for an orthodontic appliance, were inserted (Fig. 5*B*). It considerably improved his speech and aided in his mastication.

CASE 6.—Girl 8 years old, was born with a complete bilateral cleft of the lip, hard and soft palates. The first operation was performed on the lip when she was 1 week old. Her mother reported twelve subsequent palate operations, a heterograft from the ileum of the mother to the premaxillary region in the child, and also a nasal reconstruction.

Her illnesses were chicken pox when 6 years old, measles and scarlet fever at the age of 7 years.

Although she was a bright child, she was misjudged because her speech was indistinct. As one might suspect, some of her classmates teased her and mocked at her misfortune.

Her upper lip was unsupported and drooped lingually. Mastication was difficult. An oral examination showed a large and complete cleft of the hard and soft palates (Fig. 6*A* and *C*). The palatal processes had very little bony plates and the soft palate muscles were narrow with little range of contraction. The nasal fossae were lined with turgid membranes constantly filled with mixed nasal and oral secretions.

She had maxillary first molars and second deciduous molars which were about to be shed. Her first premolars were emerging. All her maxillary anterior teeth were missing.

It was decided to construct an obturator and a velum immediately, and to provide one-half round tubes for an orthodontic appliance which was to be inserted after the premolar fully erupted.

First molar bands with spurs soldered to the buccal surfaces were constructed and cemented.

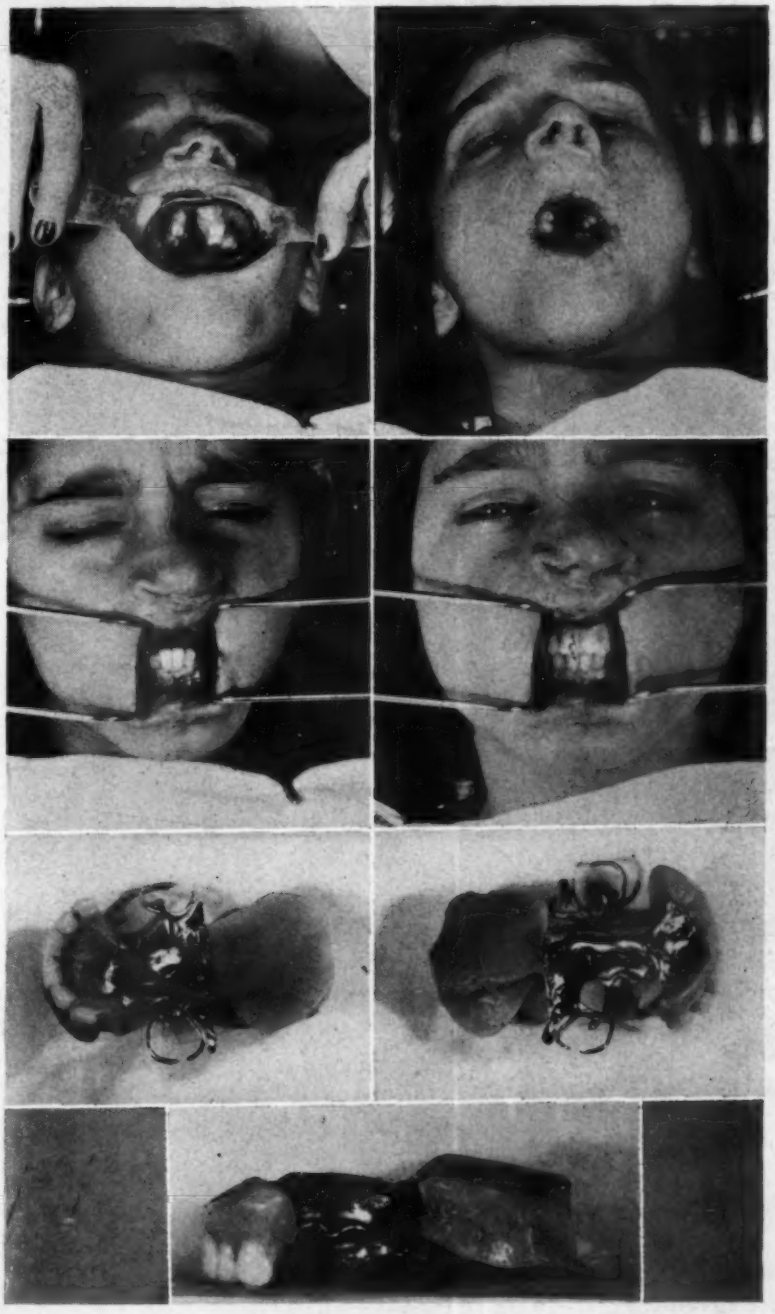
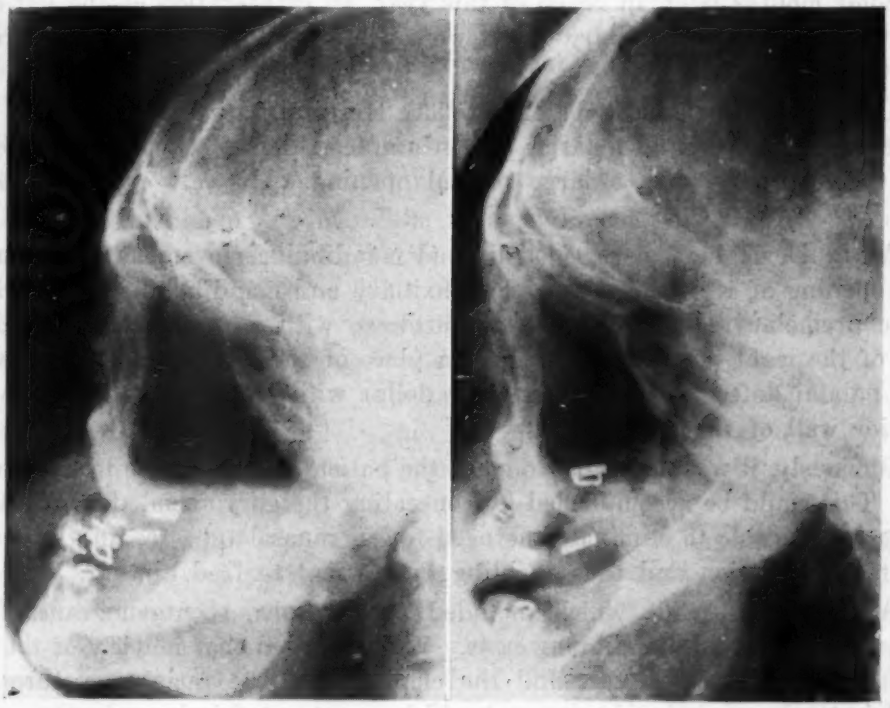


Fig. 6.—*A*, Oral view of cleft of hard and soft palates. *B*, Oral view with obturator and velum in position sealing hard palate and providing soft palate bulb. *C*, Occlusal view without appliance. *D*, Occlusal view with obturator supplying labial flange and missing anterior teeth. *E*, Photograph of oral view of obturator and velum. Note 0.5 round tubes for orthodontic appliance. *F*, Side view of obturator and velum. *G*, View of tissue side of obturator and velum. Hard palate section completes palatal dome. There is no extension into nasal fossa.

Fig. 7.—*A*, Photograph of orbital defect upon admission. (Montefiore Hospital). *B*, Photograph a few weeks later, showing extended area of destruction. *C*, Photograph of obturator and mandibular appliance connected with horizontal end wire placed in split tube and set in vertical coil spring. Outline of palatal perforation indicated by heavy line. *D*, Oral view with appliance in position. *E*, Front view showing orbital restoration. *F*, Posteroanterior roentgenogram showing extent of orbitooral defect. *G*, Profile roentgenogram with appliance in position. Mouth closed. *H*, Profile roentgenogram with appliance in position with mouth closed and at its maximum opening. (Courtesy Montefiore Hospital and David Tanchester, D.D.S.)

An impression extending from the lips to Passavant's cushion was taken in an alginate material. The impression was poured in artificial stone immediately. The anterior area corresponding to the hard palate was filled with stone to form a well-shaped palatal vault. Over this portion a vitallium base was cast with first-molar clasps which locked over the spurs on the band. Extensions for an anterior labial flange and for a posterior bulb were provided. The labial flange was built up in hard wax to raise the lip, and to improve the facial contour. It contained ground-in anterior teeth which occluded with the mandibular teeth. Posteriorly, a bulb was molded in compound. The entire appliance was placed in position in the mouth and the velum bulb was muscle trimmed, so that its lips extended over the oral and nasal surfaces of the divided soft palate. The impression was relined with a zinc-oxide impression material. The appliance was then finished in acrylic. (Fig. 6*E*, *F*, and *G*.)



G. *H.*

Fig. 7.—*G* and *H* (*For legend, see opposite page*).

The completed obturator and velum with clasps were inserted (Fig. 6*B* and *D*). The appliance for expanding the maxillary arch and improving the occlusion will be inserted.

In the meantime, her speech has improved remarkably. The turgid nasal-chamber mucosa has developed a better color and tone. There is considerable betterment in her mastication, and at present her social problem is solved for all practical purposes.

The cleft palates and perforations reported thus far were congenital in origin in contradistinction to the case which follows, in which the palate had been normal all his life.

CASE 7.—Male, aged 57 years. The medical history reports that a tumor of the skin of the nose was treated successfully with radium ten years ago.

Nine years later, a lesion of the upper right gum reported as a simple fibroma was removed. In September of the same year, he suffered a severe hemorrhage in that area.

An examination revealed an indurated mass arising from the anterior lateral and inferior walls of the antrum. Although clinically the antral lesion was suspicious of carcinoma, a satisfactory pathologic diagnosis was not obtained. Nevertheless, to give the patient relief, surgical procedure was instituted. Following a bilateral external carotid ligation, the left maxilla was resected. The pathologic diagnosis eventually was given as empyema of the antrum and osteomyelitis of the maxilla.

Some months later, in April of this year, an exenteration of the left orbit and curettage of the maxillary defect were performed, and he was fed through an intranasal tube.

The patient was admitted to Montefiore Hospital later this year (Fig. 7*A*). Our examination showed a large left orbitofacial defect which communicated with the mouth through a large palatal opening. His left eye was missing (Fig. 7*B*).

An oral examination revealed limited mandibular movement with a maximum opening of 18 mm. between the maxillary and mandibular alveolar ridges in the premolar regions. He was edentulous, with a prognathous mandible. Most of the right maxilla remained. In place of the left maxilla, there was a large palatal defect the size of a silver dollar with the roof of the cavity the superior wall of the left orbit.

Obviously, it was necessary to make the patient less repulsive to those about him. This could be accomplished by concealing the gory facial defect. It was also most desirable to eliminate the need for intranasal tube feeding by sealing the oral perforation and thus enabling the patient to feed himself.

A study was made which included photographs, roentgenograms, facial casts, maxillary, and mandibular casts. We concluded that in view of the nongranulating maxillary defect and the character of the facial structures, the facial restortion and the obturator should be constructed independently.

Using the facial plaster cast previously constructed, a wax pattern was carved to simulate the appearance of the right side, with his eye closed. This pattern was finished in acrylic with a skinlike texture. It was retained with a tissue adhesive gum (Fig. 7*E*).

From impressions taken with special trays, casts were made and articulated at the maximum mouth opening. The maxillary defect was filled in with artificial stone. Since the obturator would depend upon intermaxillary springs for retention, a modified mandibular denture had to be constructed. Four split round tubes, 15 gauge, to which tail pieces were added were inserted into their respective maxillary and mandibular premolar regions. A vertical spring, set in right-angled end wires, fitted into the tubes which opened occlusally. The

articulation was then closed down sufficiently only to permit the grinding in of anterior teeth of reduced size. (Fig. 7*F*, *G*, and *H*.) Occluding premolar and molar stops were waxed on both sides and finished in acrylic resin (Fig. 7*C*). The reduced vertical height of the teeth left spaces which permitted food to pass into his mouth. The springs retained the obturator in place (Fig. 7*D*).

A recent hospital progress report is as follows:

"When patient uses dentures and prosthesis, he is able to take solid food. His speech can be understood. His appearance is improved. However, the patient is uncooperative and often refuses to use dentures and prosthesis, and must be tube fed. His condition is weaker."

ANKYLOSIS OF THE TEMPOROMANDIBULAR ARTICULATION

The temporomandibular articulation is a ginglymoarthroidal joint and can be readily palpated anteriorly to the tragus of the ear. It consists of the eminentia articularis, synovial membrane, articular discs, ligaments, the external pterygoid muscle, and the head of the condyle of the mandible.

The special character of this joint permits the mandible to be depressed, elevated, moved forward, backward, and rotated from side to side.

The movements of the mandible may be limited by changes within the joint or by changes external to the joint. These may be due to direct trauma, infective processes within the joint, inflammatory processes adjacent to the joint, exanthematous fevers, metastatic abscesses, or scar tissue in adjacent muscles due to injury or radiation therapy.

The alterations within the joint, or intra-articular ankylosis, will restrict the movements of the mandible. They are of the fibrous or the bony type and may be complete or incomplete. They may be unilateral or bilateral and will cause a facial deformity.

A unilateral ankylosis is manifested by a reduced maximum opening between the maxillary and mandibular teeth and by deviation of the mandible toward the affected side, which gives the affected side a seemingly full, normal appearance, while the opposite side, which is normal, contradictorily has a flattened appearance. As a matter of fact, due to interference in growth, the anatomical distance between the condyle and the symphysis on the affected side is less than the same landmarks on the unaffected side, which is normal in length.

In a bilateral ankylosis the mandible is immobile. Growth has been retarded on both sides, the chin is markedly receded, and the entire mandible is undeveloped. The maxillary anterior teeth are excessively protruded. The occlusion is poor, generally a distoclusion. Fortunately, there is a space between the maxillary anterior teeth and mandibular anterior teeth, enabling the individual to stuff food between his teeth into his mouth.

Surgical interference is required for relief and postoperative follow-up to maintain the gains. I shall limit my discussion to recurrence and to postoperative care.

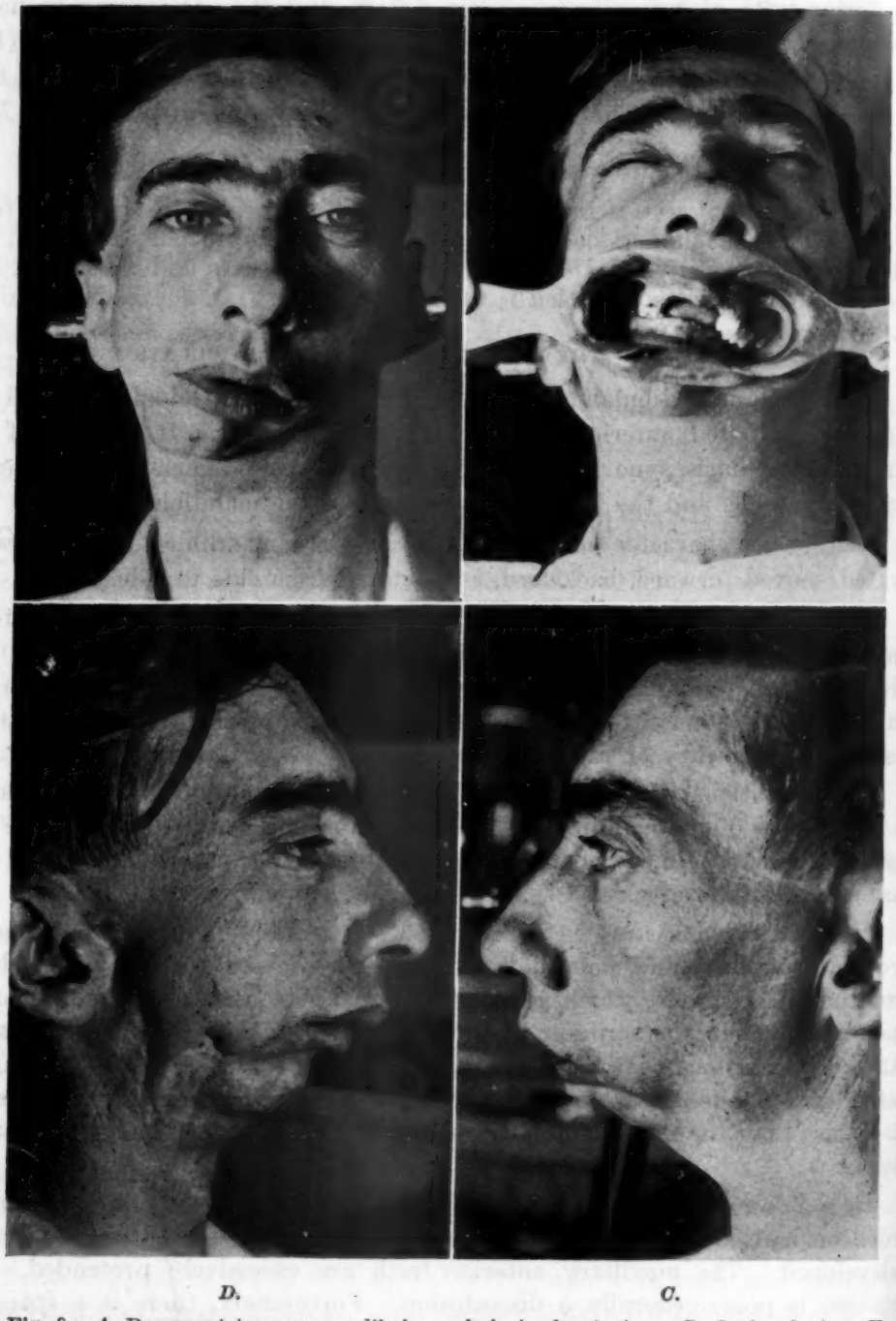


Fig. 8.—*A*, Recurrent temporomandibular ankylosis, front view. *B*, Occlusal view. Forced maximum opening equals 8 mm. in premolar region between alveolar ridges. *C*, Left profile (normal side), but seems to be more flattened than affected side. *D*, Right profile appears more normal although it is the affected side. *E*, Maximum opening three years later. Caliper indicates 18 mm. without effort. *F*, Appliance with extension hooks for reverse intermaxillary force. *G*, Right profile roentgenogram indicates space between bone ends without appliance at beginning of treatment. *H*, Right profile roentgenogram with appliance in mouth, showing increased space between bone ends.

CASE 8.—Male, aged 30, as a child had measles, scarlet fever, chicken pox, and whooping cough. At the age of 5, the right mandibular second deciduous molar abscessed. An external incision was necessary. Drainage from the wound continued for one year, when he was operated upon and two sequestra of bone were removed.

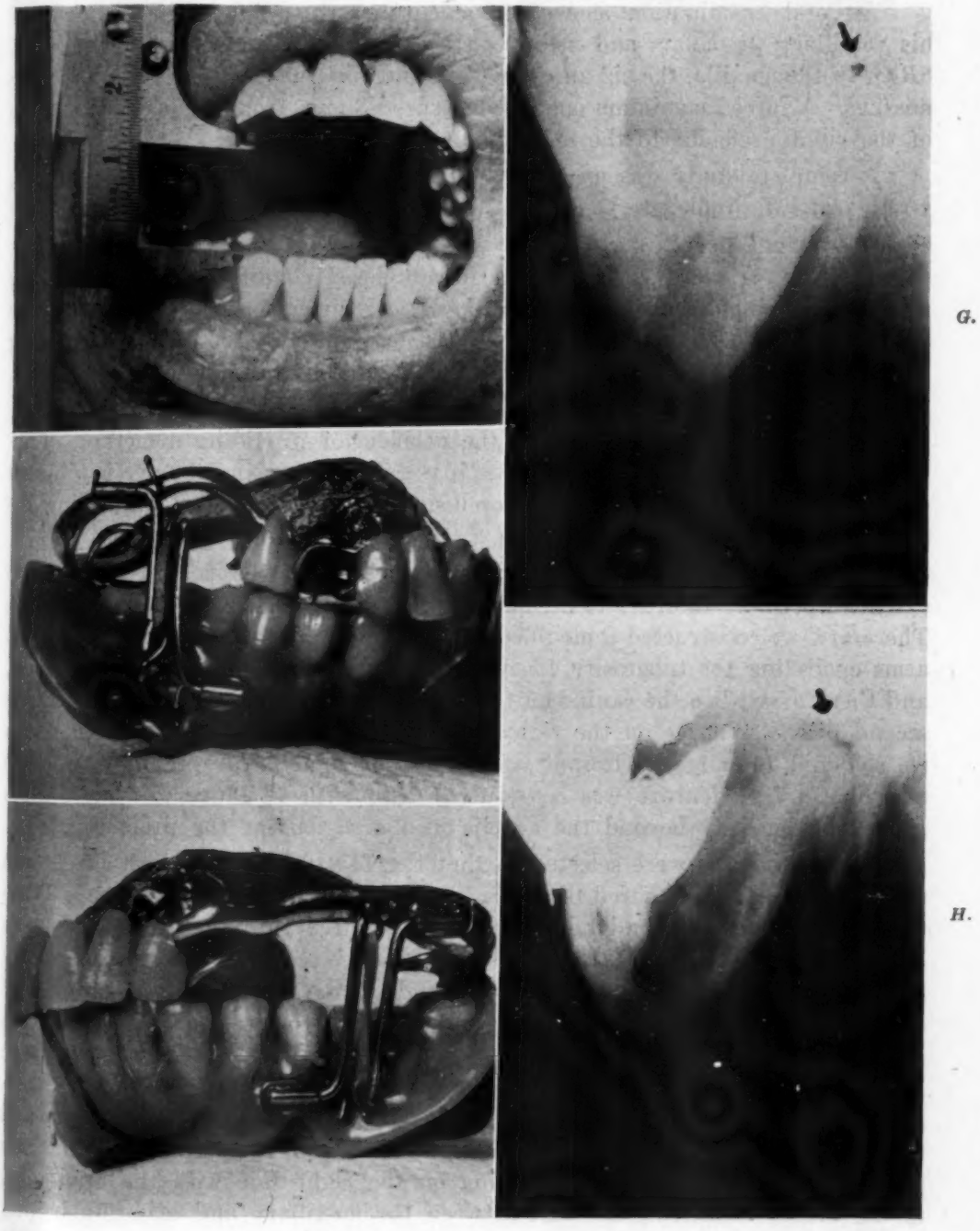


Fig. 8.—*E-H* (*For legend, see opposite page*).

Ankylosis of the right temporomandibular articulation set in at the age of 7 years. His jaws remained closed until an arthroplasty was performed when he was 11 years old. He was operated upon again when he was 15. The postoperative diagnosis was osteomyelitis in the right mandible. At the age of 30, all his mandibular teeth had to be extracted, and a relapse of ankylosis followed.

An oral examination showed an edentulous mandible with imprints of his maxillary premolars and molars on the mandibular alveolar mucosa (Fig. 8*B*). In the maxilla, the six anterior teeth and the right second premolars were missing. A forced maximum opening measured 8 mm. from the occlusal surface of the right premolar to the mandibular alveolar ridge.

A complete study was made, including photographs (Fig. 8*A*, *C*, and *D*), x-rays (lateral, profile, etc.) (Fig. 8*G*), and a facial cast with oriented maxillary and mandibular casts.

From experience, we know that in ankylosed conditions where opposing teeth are missing, resulting in reduced vertical dimension, the muscles on the affected side contract with increased muscular spasm. Instead of providing additional space the equivalent of the height of the crown of extracted teeth, the contrary happens, with aggravating consequences.

Therefore, we were faced with the problem of providing a method of increasing the opening between the jaws, if possible, increasing the vertical height of the affected side to balance the occlusion, at the same time improving the muscle tone through exercise.

It should be emphasized that muscle exercises must be carried out over an extended period. In order to accomplish this, the occlusion had to be balanced. Therefore, we constructed a modified upper partial denture (in vitallium) with arms encircling the tuberosity from the palatal surface to the buccal surface, and then forward to the canine on the left, and from the palatal surface to the second premolar space on the right. These arms provided the base, to which we soldered 14-gauge horizontal tubes in the second molar regions. For the mandible a full denture was constructed, also with 14-gauge all-round tubes projecting buccally beyond the acrylic in the regions of the premolars.

These locations were selected so that the 14-gauge wires which fitted into the tubes could be contoured to give a forward and downward direction. These wires were removable and adjustable. They fitted into the tubes and were locked into place with a 21-gauge spur soldered occlusally to the horizontal bend and engaging the mesial and distal ends of the tubes. The 14-gauge wire extended downward from the upper and upward from the lower, terminating in an intermaxillary hook also of 21-gauge wire. The restorations, with the intermaxillary posts locked in place, were inserted. From these hooks, intermaxillary rubbers acting in reverse were worn, and exerted a downward and forward force with gratifying results (Fig. 8*F* and *H*). A follow-up three years later showed the mouth opening on the right side with the appliances in the mouth measuring 20 mm. between the maxillary and mandibular premolar teeth (Fig. 8*E*).

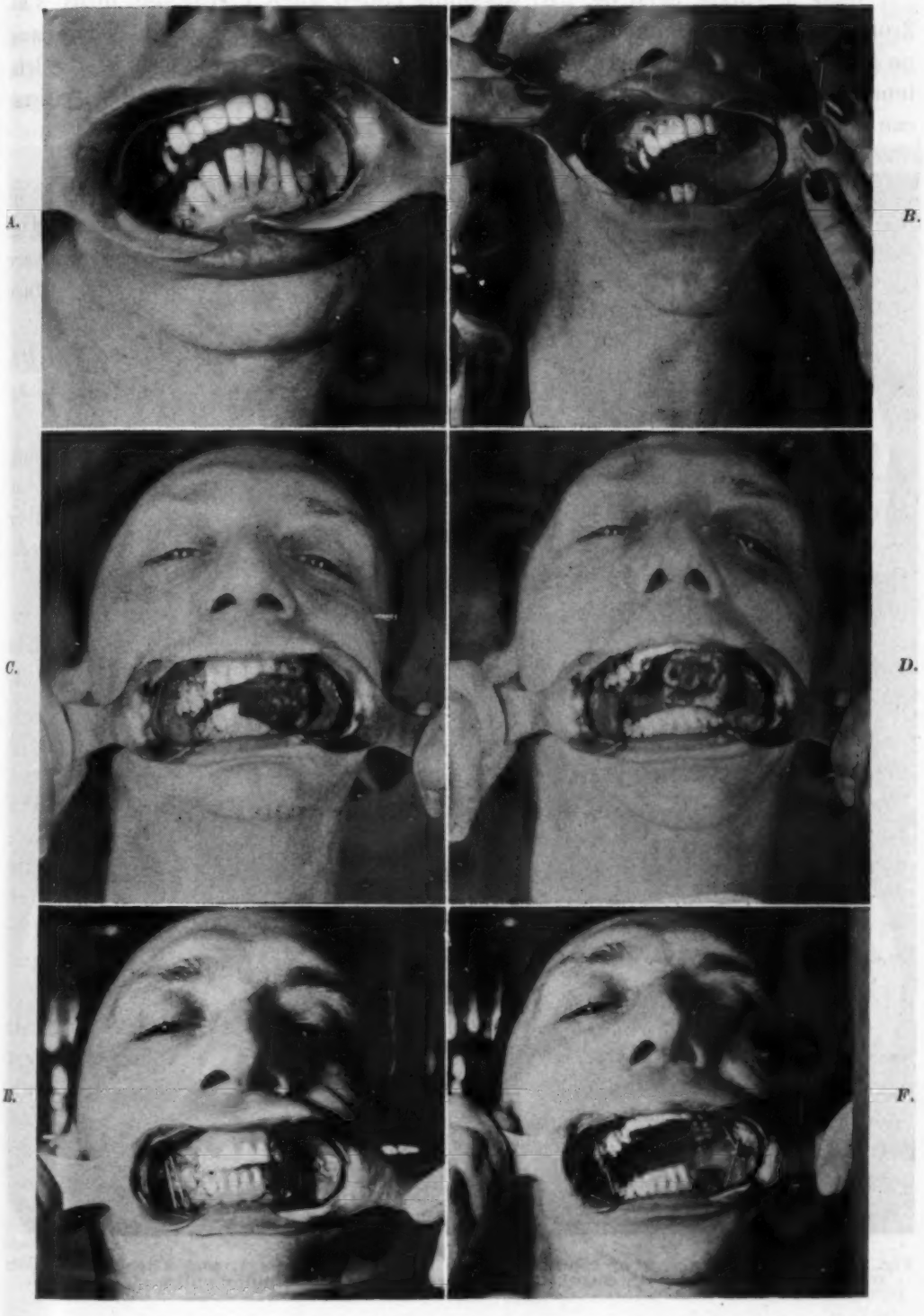


Fig. 9.—*A*, Oral view before operation, maximum opening between canines equals 3 millimeters. *B*, Oral view after operation of left condyle measured 19 millimeters. *C*, Mouth closed, rubber prop exerciser in position. *D*, Mouth open, rubber prop exerciser in position. *E*, Appliances with extension rods and intermaxillary rubbers in position, mouth closed. *F*, Appliances with extension rod and intermaxillary rubbers in position, mouth open. Maximum opening equals 28 millimeters.

CASE 9.—Male, aged 34, had whooping cough when 1 year old, measles at 2 or 3 years of age, and scarlet fever when he was 12 years old. There was no history of injury to his mandible, ramus, or condyle. Ankylosis of the left temporomandibular articulation became apparent at the age of 6. The patient can recall only limited mandibular motion.

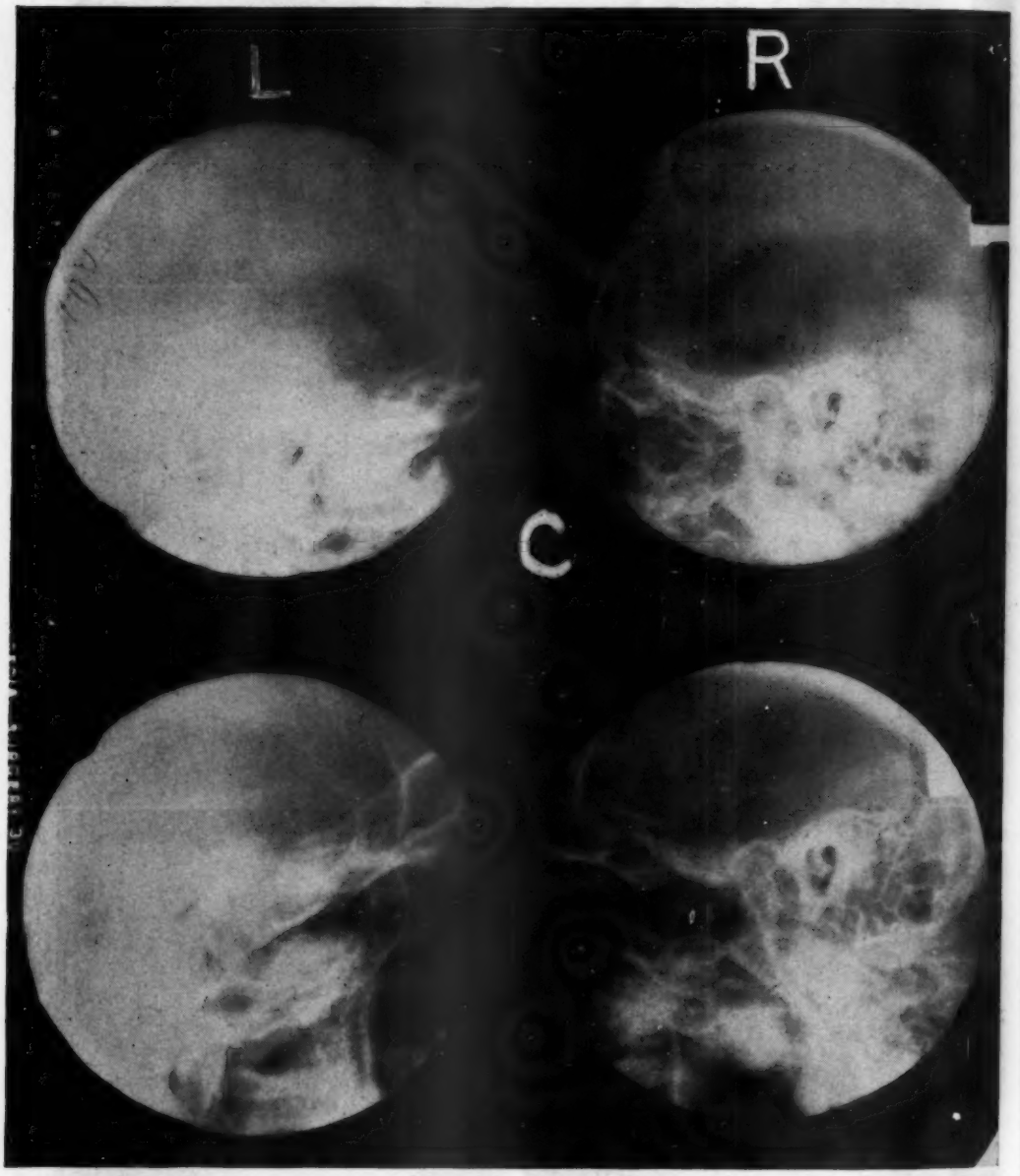


Fig. 9.—*G*, Roentgenograms of condyles before (upper illustrations), and after (lower illustrations) osteotomy, mouth closed. Note enlarged left condyle filling entire glenoid fossa.

An oral examination showed a very restricted mandibular movement. The maximum opening between the maxillary and mandibular canines measured 3 mm. (Fig. 9*A*).

His chin deviated toward the left. The right side was flattened, while the left side appeared full. It was impossible to take full impressions. Only closed- and open-mouth impressions of the labial and buccal tooth surfaces were possible and were taken.

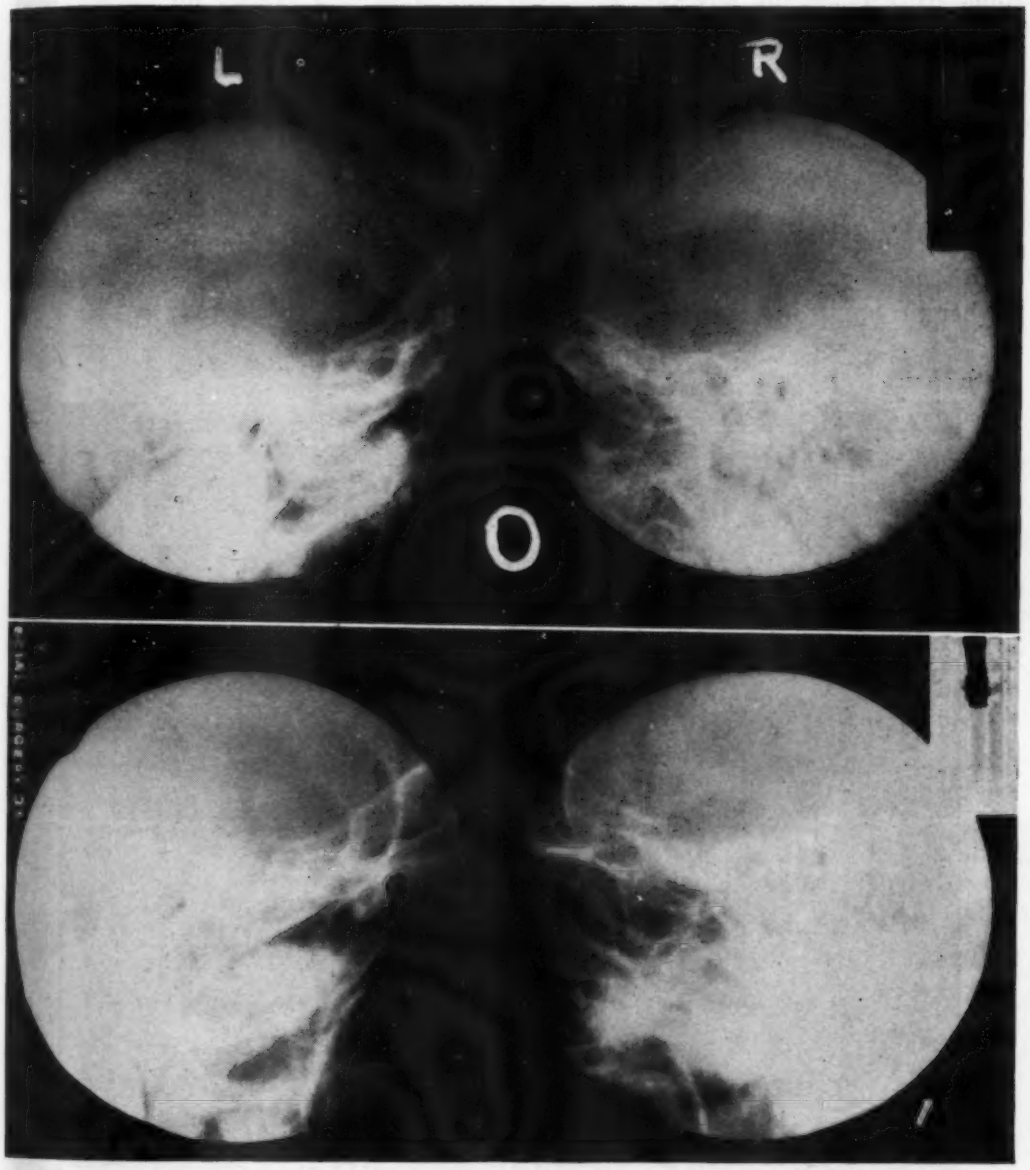


Fig. 9.—*H*, Roentgenograms of condyles before (upper illustrations), and after (lower illustrations) osteotomy, mouth open. Note forward position of right condylar head after osteotomy.

Stereoscopic roentgenograms of the temporomandibular articulations showed that with an attempted opening of the mouth the right condyle moves slightly toward the articular eminence.

The left temporomandibular joint seems to consist of a very large, smooth, bony protuberance which rests in a corresponding large glenoid. A joint width

seems to be present, but with attempted opening of the mouth, this condyle does not move forward at all (Fig. 9*G* and *H*). (R. W. Lewis, M.D.)

Notwithstanding the normal appearance of the left side of his face, the roentgenographic study confirmed the clinical diagnosis that the source of the difficulty was on the left side and that ankylosis was caused by an enlarged and locked head of the left condyle.

Before the operation, a rubber prop was constructed. Using the open mouth study cast as a guide for the occlusal planes, a plaster mold was made. It was filled with liquid latex. Stethoscope tubing was folded on itself and the closed end was inserted into the latex matrix. The open ends projected above the latex level. The excess tubing and latex were trimmed off later.

An osteotomy was performed by Dr. Burdick and Dr. Maier, removing the entire head of the left condyle. Immediately following the operation, the rubber prop was inserted and worn continuously.

Fig. 10.—*A*, Front view after bilateral temperomandibular arthroplasty. *B*, Profile view after surgery. Lack of mandibular development. *C*, Occlusal view after bilateral resections, open bite of 10 millimeters. *D*, After operation, maximum opening is 25 millimeters.

Two weeks after the surgery, his mouth opened 19 mm. maximum (Fig. 9*B*), and sectional impressions were taken for the construction of trays. In the meantime, his dentist removed the upper anterior bridge and inserted all necessary fillings.

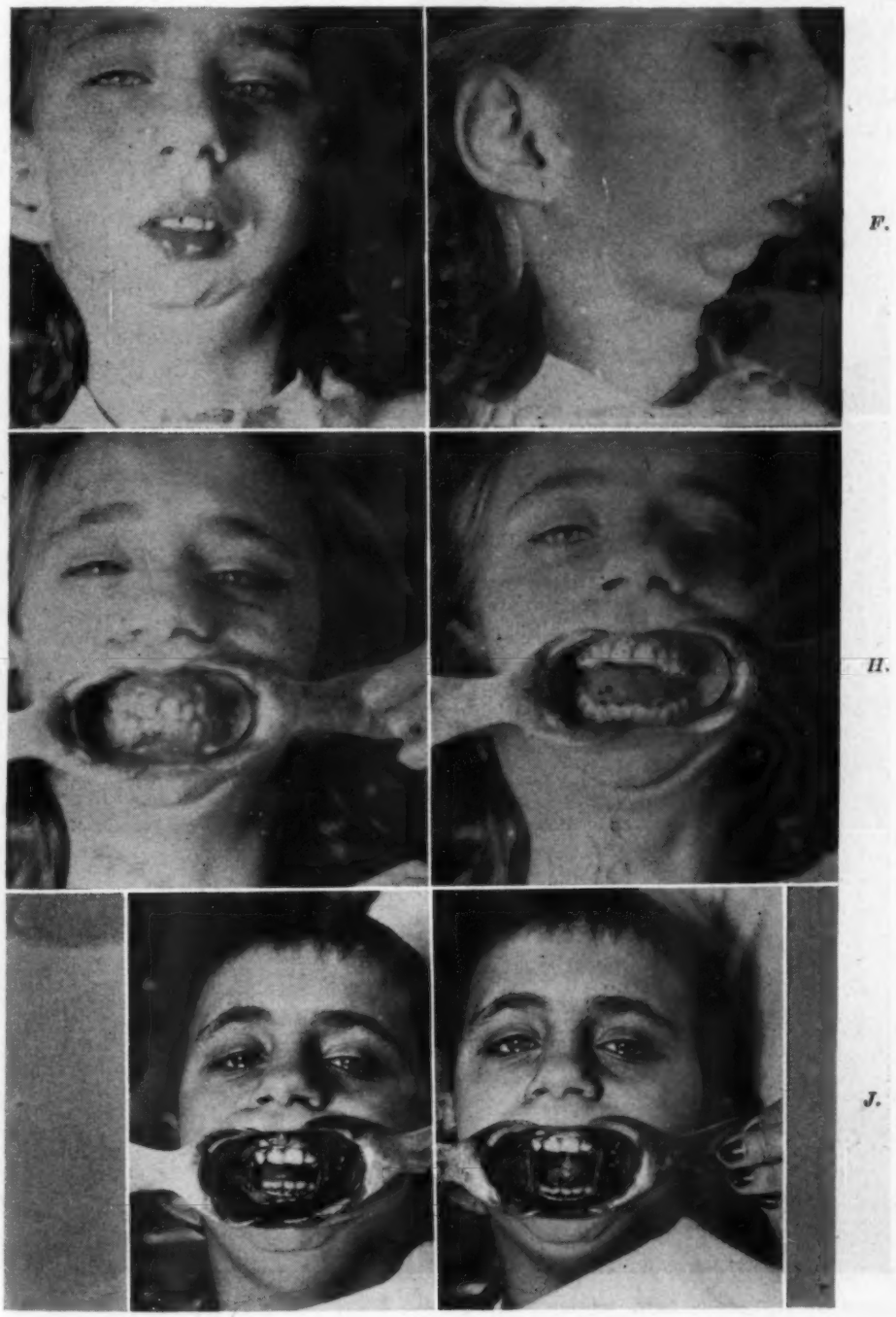


Fig. 10.—*E*, Front view after orthodontic treatment. *F*, Profile view after orthodontic treatment. *G*, occlusal view after orthodontic treatment, open-bite corrected. *H*, Maximum opening of 26 mm. after orthodontic treatment. *I*, Orthodontic appliances with intermaxillary rubbers in place to overcome open-bite. *J*, Maximum opening at outset of orthodontic treatment, appliance in position.

With special trays, maxillary and mandibular impressions were taken. The bases for the buccal tubes for the lengthened removal rods, terminating in intermaxillary hooks for reverse force as described in the previous case report,

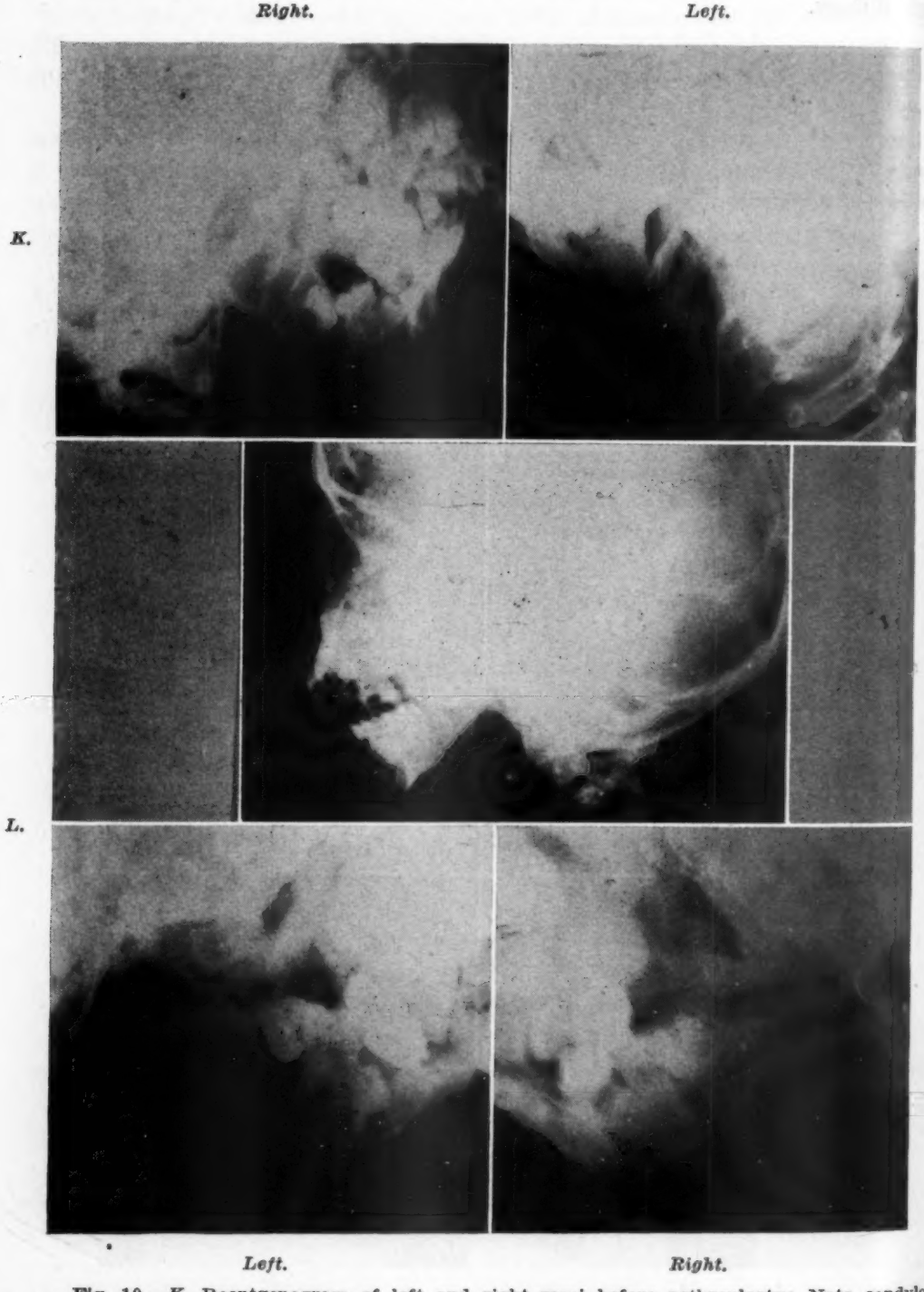


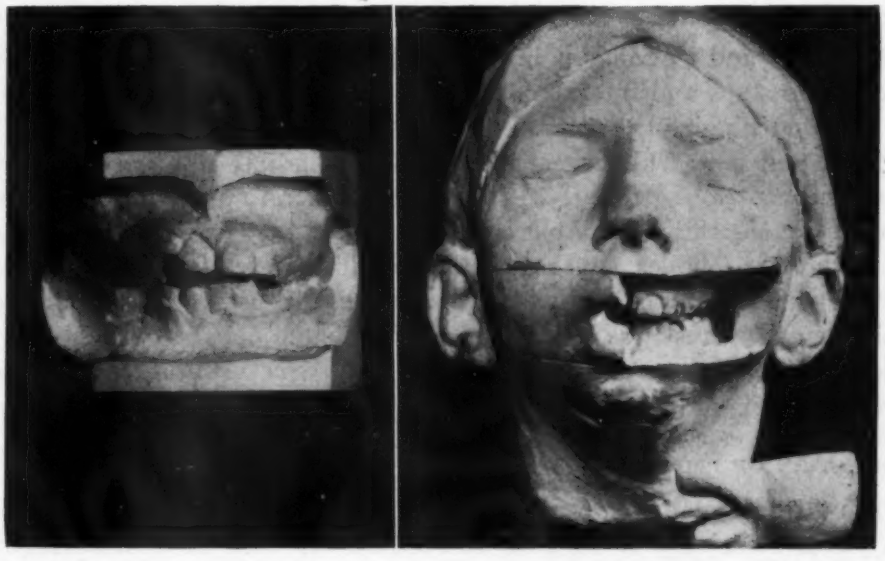
Fig. 10.—*K*, Roentgenogram of left and right rami before arthroplasty. Note condyles and coronoid processes fused to adjacent bone. *L*, Roentgenograms of rami after arthroplasty. Bilateral horizontal resections necessary for relief of ankylosis.

consisted also of vitallium bases with encircling tuberosity arms or saddles. On the buccal of these arms, the all-round 14-gauge tubes were soldered. Intermaxillary rubbers supplied the separating stretching force and its stimulating muscular exercises.

Periodical checkups were made: four months after the operation, the maximum mouth opening increased to 24 mm., and again one year later, the opening increased to 28 mm. (Fig. 9*C*, *D*, *E*, and *F*).

It is two years since the osteotomy. Reports indicate fine cooperation, with even still further improvement in the maximum opening measurement between his canine teeth.

CASE 10.—Girl, aged 8 years. According to the medical history, she had whooping cough and mumps at the age of 2½ years, followed by ankylosis. She was operated upon at 4 years of age and again at 5 years, with unfavorable results.



M. *N.*

Fig. 10.—*M*, Cast before operation showing labial and buccal surfaces only. *N*, Facial cast with dental insert after orthodontic treatment.

When we examined her at the age of 8, there was a complete immobility of the mandible. The mandible was underdeveloped, the chin receded. Her maxillary anterior teeth protruded. A space between these teeth and the mandibular ones provided the opening through which she pushed her food (Fig. 10*M*).

Roentgenograms of the left and right condylar area showed fused masses of bone (Fig. 10*K*).

Bilateral temporomandibular arthroplasty was performed first on one side and then on the other. At the time of the operations, the coronoid processes were found fused to the surrounding bone. A horizontal strip of the ramus was removed and pieces of the fascia lata interposed between the bone ends.

After the bilateral arthroplasty, the mouth opened a maximum distance of 25 mm. The problem in this situation differed from the previous cases in that a dropped mandible followed the operation, with an open-bite of 10 mm. between the anterior teeth when the mouth was closed.

Routine photographs, x-rays of the teeth, lateral plates were taken, and maxillary and mandibular casts were made (Fig. 10*A*, *B*, *C*, *D*, and *L*). To overcome the underslung mandible was one of our perplexing problems. At the same time we had to provide muscle stimulation.

An oral examination showed a bilateral distoclusion with badly decayed teeth. The maxillary first molars had emerged, but the mandibular molars remained unerupted.

Consequently, bands were constructed, adapted, and cemented for the maxillary first molars and for the mandibular second deciduous molars. Bands with spurs were also constructed, adapted and cemented for the maxillary second incisor teeth and for the mandibular left and right first and second incisors.

Maxillary and mandibular labial appliances were constructed. There were molar spring stops and intermaxillary hooks in the canine regions. The hooks were directed gingivally. These served as retention for intermaxillary force (Fig. 10*I* and *J*). This force brought the mandible upward and forward, closing and controlling the underslung mandible and open-bite. In the region of the resection, this action increased the space between the bone ends. In time the levator muscles attached to the mandible were strengthened and overcame the dropped mandible. One year after the use of the appliance, the mouth opening at rest was 2 mm. and the maximum opening was 24 mm. The appliances were worn for a year and a half. Six months later, a checkup showed a maximum mouth opening to be 26 mm. (Fig. 10*E*, *F*, *G*, *H*, and *N*).

CORRECTION OF PROGNATHOUS MANDIBLES UTILIZING THE SURGICAL FRACTURE

The ultraprognathous mandible causes a facial deformity, which in selected cases yields amazingly to surgical correction. It must be acknowledged that orthodontics alone in this type of malocclusion cannot accomplish satisfactory results.

The surgical approach involves the deliberate fracturing of the mandible under strictly surgical procedures, either by removing sections of bone from the body of the mandible or by the fracture of both rami. The former method was shown by Thoma at one of our meetings. There was a preoperative study and a carefully planned operative procedure, in which predetermined blocks of bone were removed from the premolar regions sufficient to set the anterior teeth into normal occlusion. Then the fractured mandible was treated as a compound multiple fracture.

The latter method was demonstrated by Winter at another of our meetings. It also involved preoperative study, exact planning, and a preliminary preparation of the patient for the operation. At the operation, both rami were fractured, using a Gigli saw to surgically divide them. Then the mandible was

pushed back and set into a neutroclusal relationship to the maxillae. The fractured rami were treated as a compound multiple fracture.

Whichever method is followed, the treatment is a radical procedure. As is well known, there are hazards in surgery, but there are also manifold benefits. These should not be minimized nor magnified. It should be borne in mind that what one operator may consider a hazard, another may not consider a hazard at all but a passing phase, or perhaps difficulties readily controlled, and as a matter of personal equation he may believe the end results warrant all efforts to overcome those obstacles.

However, there are situations in which resections are definitely contraindicated or where postoperative care is specifically an orthodontic problem. I shall attempt to stress such cases.

A prognathous mandible with a history of progressive protrusive growth with spaced mandibular teeth may be indicative of an endocrine disturbance and an early sign of acromegaly.

Acromegaly is an anterior pituitary disturbance in which there is an overproduction of the growth hormone. It appears after the epiphyseal ends of long bones have ossified.

Jaw resection in acromegalic conditions for the relief of the protrusive mandible would be of no avail and is contraindicated.

The progressive protrusion of the mandible may be the sequel to the loss of maxillary teeth resulting in the contraction of the maxilla, and should not be confused with the perversion of growth processes caused by endocrine secretions (Fig. 5*E*).

A generalized skeletal condition in which there is a disturbance of normal bone formation with an increased marblelike density of all bones, is known as osteopetrosis, Albers-Shönberg disease, or marble bone. There is a peculiar barrellike modification in the outline of all the long bones and an overgrowth of the mandible.

CASE 11.—Male, 28 years old, reported by Higenbotham and Alexander,[7] sought their attention because of his oversized jaw.

"From the time he had been six months old it was noted that his jaw and head were not natural.

"Patient had known since his youth that his lower jaw was unusually prominent, but it caused no pain and functioned properly. As he grew older, the jaw grew progressively larger and more protuberant, until it became an acute cosmetic difficulty. With the protrusion of the lower jaw, the teeth no longer approximated those of the upper jaw and all mastication was done with the molars. The front teeth became irregular and uneven and several were removed for cosmetic reasons. The enlarged and poorly functioning lower jaw interfered with phonation and his speech became rather indistinct. However, it was for cosmetic reasons that he sought medical attention. . ."

The lower jaw when closed extends 1.5 cm. beyond the upper jaw and there is no approximation of the anterior teeth.

To quote further from Higenbotham and Alexander:

"Pathological fractures are frequently noted, but they are not an essential feature. The marbleized bone is not necessarily more brittle and if fractures occur there is no delay in healing.

"But infection of the bone offers the most serious hazard to these patients. In particular infections of the jaw are to be dreaded as they are most dangerous to the life of the patient."

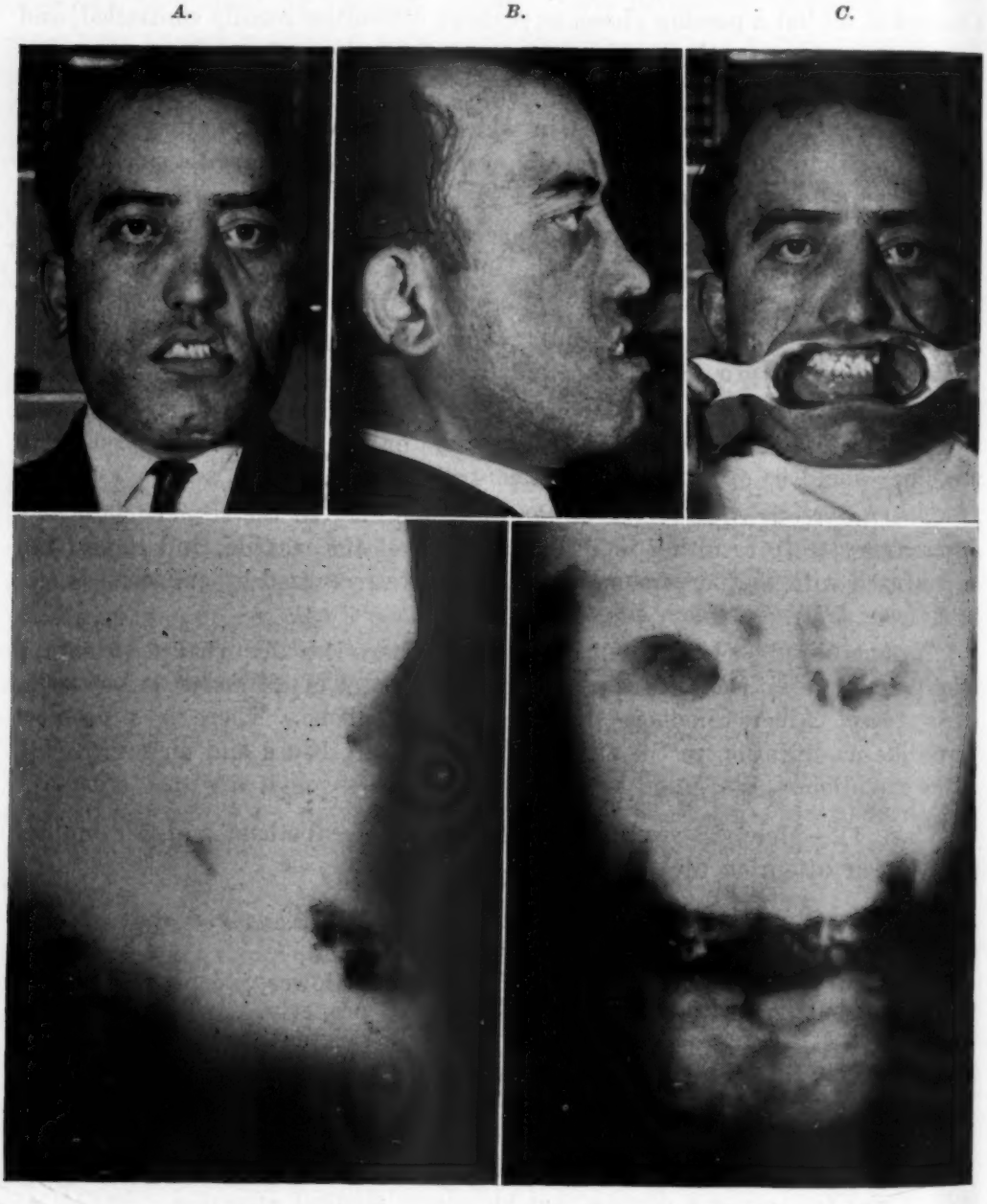
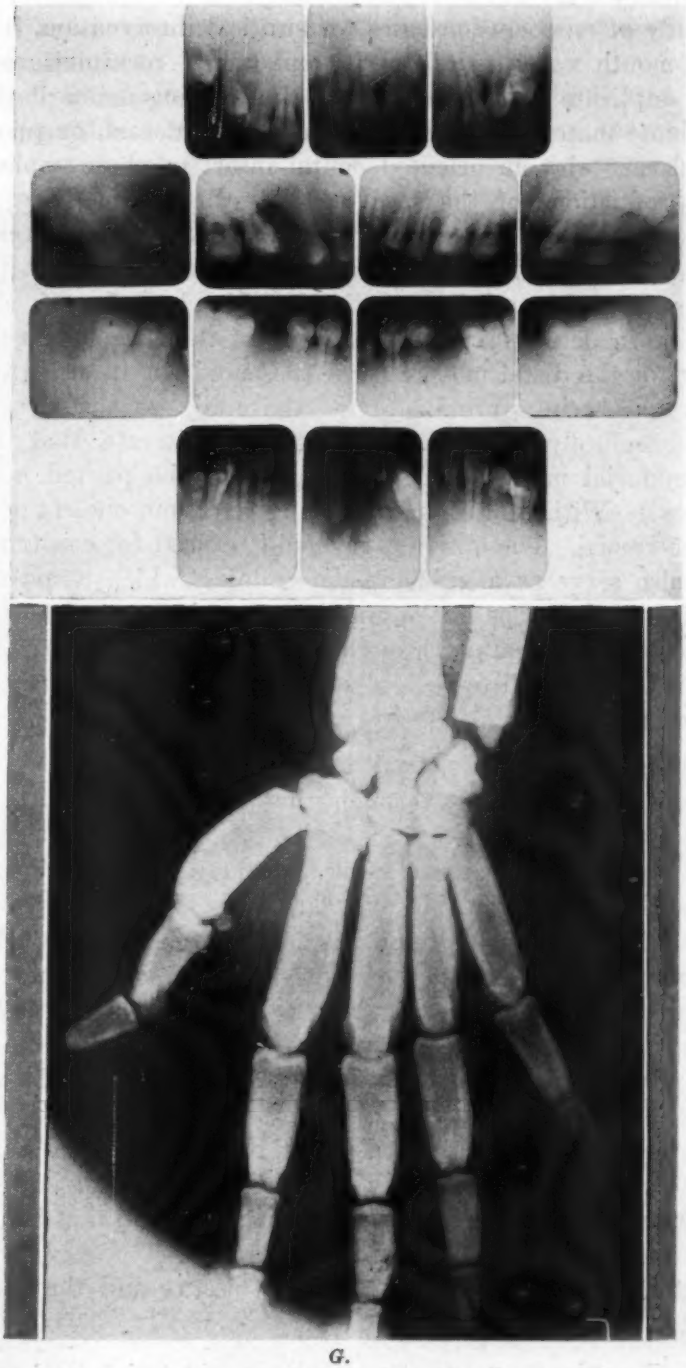


Fig. 11.—*A*, Albers-Schönberg disease, marble bone, or osteopetrosis. Front view, note massive facial structures. *B*, Profile view indicating extremely prognathous mandible. *C*, Occlusal view. Mandibular anteriors close 1.5 cm. in advance of maxillary incisors. *D*, Profile roentgenogram. X-ray penetrates dense bone with difficulty. *E*, Anteroposterior view also impenetrable to x-rays. *F*, Full-mouth x-ray series required an unusually long exposure. *G*, Hand shows peculiarly barrel-shaped metacarpal and phalanges.

F.



G.

Fig. 11.—*F* and *G* (*For legend, see opposite page*).

It is thus apparent from the authors' description, that resection to correct the prognathous mandible is definitely contraindicated in such cases (Fig. 11*A*, *B*, *C*, *D*, *E*, *F*, and *G*).

In the study of mesioclusion cases for surgical intervention, it is necessary to have a full-mouth x-ray series, profile and lateral roentgenograms, accurate study casts in duplicate made from accurate impressions using plaster or hydrocolloid or alginate material, wax bite guides, a facial cast, or photographs. I prefer a facial cast with an oriented dental insert to photographs, since casts are actual reproductions of the face in three dimensions (Fig. 10*N*). The roentgenograms, not overlooking the oral examination, will determine the state of health of the teeth and gums and adjacent tissues, with the possibility of disclosing unsuspected conditions. The lateral plate (roentgenogram) can serve as a guide in determining the direction of the surgical fracture and the probable limit for the distal movement of the mandible, in order that the fracture segments may be in approximation. Above all, exact casts of the teeth in duplicate are absolutely essential. (And may I reiterate, that if alginate or hydrocolloid material is used, the impression must be poured immediately to insure accuracy.) With conditions indicating resection, one set of casts should be kept for the record. The other casts should be used for constructing splints. They should also serve as a guide in determining which cusps will interfere with the locking of the cusps in the anticipated occlusion and how much of the interference must be eliminated through preoperative grindings.

Perhaps it may be well to review some cardinal facts in prognathous mandibular correction:

1. The patient is a late adolescent or adult.
2. Movement of the teeth through the alveolar process by orthodontic appliances is essentially limited.
3. Excessive movement or excessive force may cause the extrusion of the roots of the teeth through the thin alveolar plates.
4. The maxillary and mandibular teeth and arches are not always in harmony. The maxillary arch may be underdeveloped or lacking in tooth elements, and the mandibular arch may be overdeveloped with a full complement of teeth. The reverse may be true, with the maxilla overdeveloped and the mandible long and narrow with teeth missing. There may be elongation of individual teeth into opposing spaces.
5. A bilateral fracture is planned, and therefore there will be a problem of reduction of segments to a definitely modified anatomic position of the mandible, the tongue and adjacent structures, bearing in mind that bone ends should approximate when the fracture is set.
6. The stabilization and fixation must be secure and the teeth should be healthy to serve as anchorage.

Case 12.—Female, 28 years of age, who sought relief for her prognathism through surgical intervention.

She had chicken pox at the age of 5 years. There was no history of rickets. An oral examination showed a mesioclusion (Fig. 12*C*), her lateral photographs

showed a protrusive mandible (Fig. 12*A*), the front view showed an underdeveloped maxilla (Fig. 12*B*). The x-rays of her teeth showed a periodontal condition. The maxillary and mandibular teeth are particularly significant, as they serve as the medium for stabilization and fixation of the surgically fractured mandible.

A further oral examination revealed that the patient was capable of retracting the mandible, so that the maxillary anteriors and mandibular anteriors

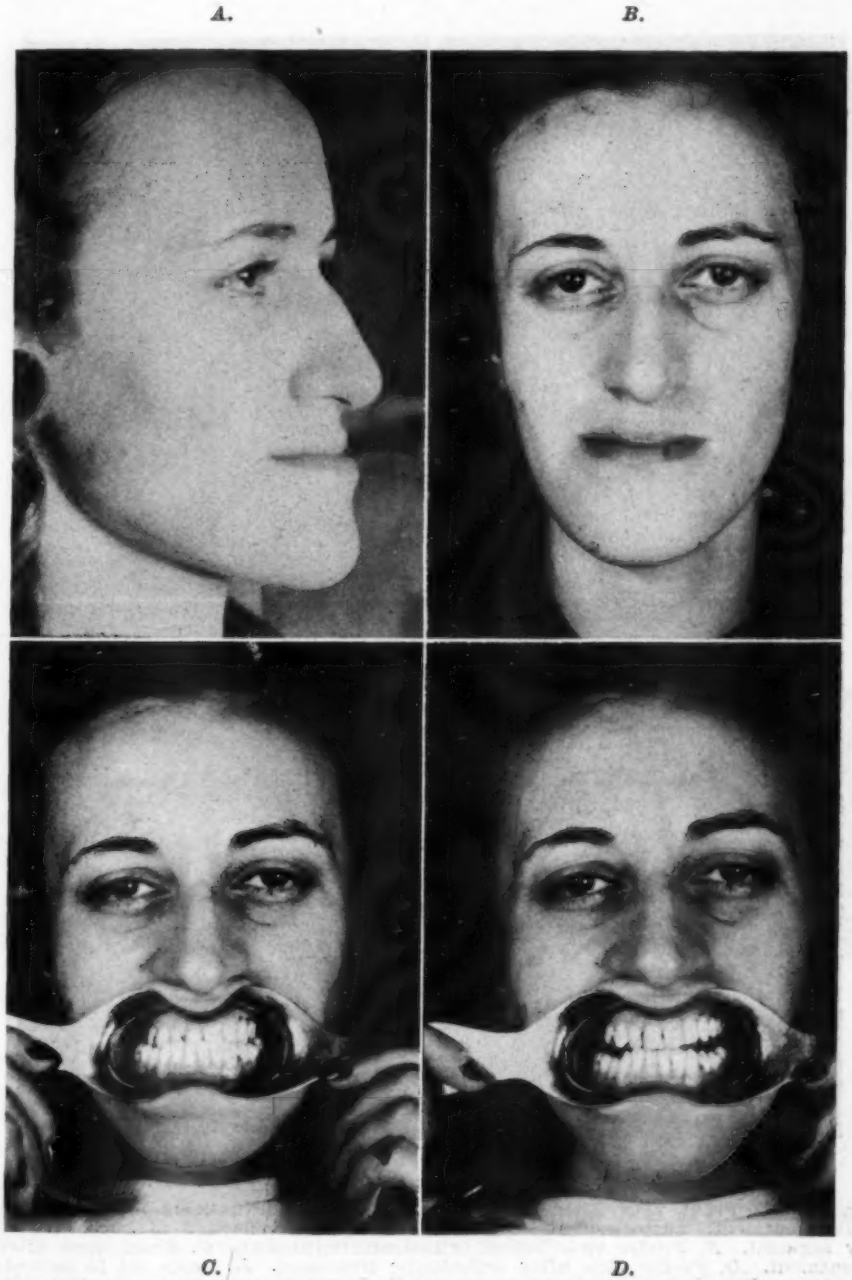


Fig. 12.—*A*, Profile of prognathous mandible. *B*, Front view, underdeveloped maxillary regions. *C*, Occlusal view. *D*, Forced retraction of mandible with anterior teeth in an edge-to-edge occlusion.

could be brought into edge-to-edge occlusion (Fig. 12*D*). While the models, photographs, profile x-ray, gave the impression of a mesioclusion, it definitely was not an ultramesioclusion.

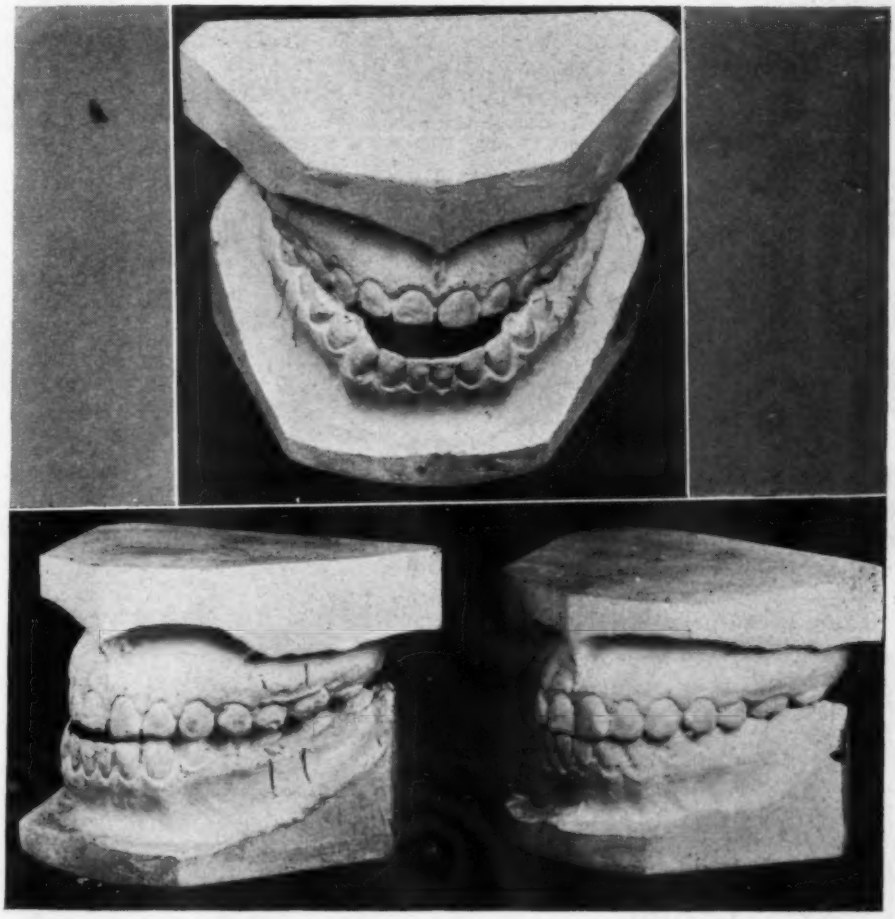
Fundamentally, the jaw relationship would indicate that resection should not be done. The further fact that her teeth had a periodontal condition contraindicated so drastic a treatment. Since tooth movement was within reason-

Fig. 13.—*A*, Front view after surgical correction of prognathous mandible, but before orthodontic treatment. Distortion at left angle of mouth, a reflection of buccoversion of left maxillary segment. *B*, Profile view before orthodontic treatment. *C*, Front view after orthodontic treatment. *D*, Profile view after orthodontic treatment. *E*, Casts set to indicate ultraprognathous mandible before surgical correction. *F*, Casts after surgical correction. Maxillary left premolars and molars in buccoversion. Malocclusion within range of orthodontic therapy. *G*, Casts after orthodontic treatment. Note normal cuspal interdigitation.

able limits, orthodontic treatment could be depended upon to accomplish favorable changes.

With the markedly protrusive mandible, the maxillary region of the face appears undeveloped and flattened, the gonial angle is obtuse. If the rami were divided, the greatest advantage of resection would be in the changed posture of the mandible, the modified direction of the facial muscles, and the altered occlusion of the teeth, so that they would be in a favorable relationship or they

E.



F. *G.*

Fig. 13.—*E-G* (*For legend, see opposite page*).

would be within the realm of orthodontic correction. There would be a maximum improvement of the facial contour, profile as well as front view. This could not be accomplished by orthodontics alone, nor by surgery alone, but through the combination of both.

The case to be described is one in which orthodontic treatment was made possible following the resection of the mandible.

Case 13.—Female, aged 18, gave the history of rickets at 1½ years of age. Her tonsils and adenoids were removed at the age of 6 years. A bilateral frac-

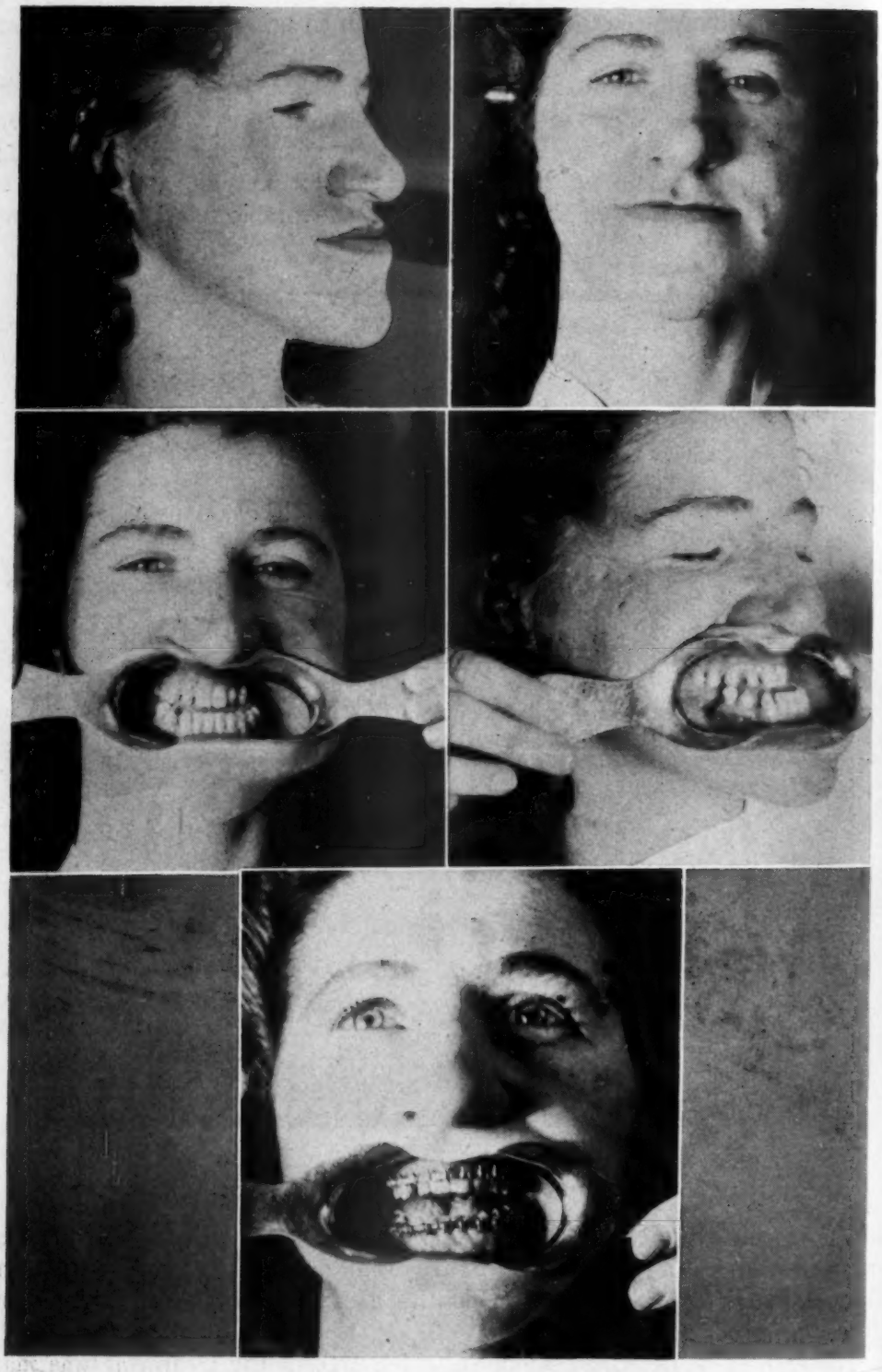
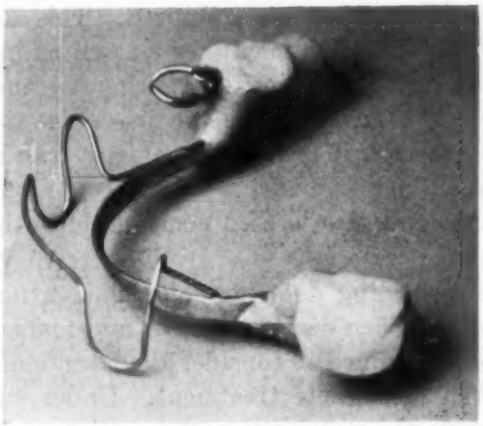


Fig. 14.—*A*, Profile of ultraprognathous mandible. *B*, Front view before surgical correction. Underdeveloped maxillary regions. *C* and *D*, Occlusal views before resection. *E*, Occlusal view after resection showing "hung" mandible. *F*, Mandibular denture to which continuous labial spring was added. (Courtesy of S. Lubalin, D.D.S.) *G*, Profile view three years after resection. *H*, Front view after resection. *I*, Occlusal view with artificial restorations in place three years after resection.

ture of the rami for the correction of prognathous mandible was done at 17½ years (Fig. 13*E*).

Her occlusion was a modified Class III with the left maxillary premolars and molars in buccal relationship to the mandibular teeth (Fig. 13*A*, *B*, and *F*).



F.

G. *H.* *I.*

Fig. 14.—*F*, *G*, *H*, and *I* (*For legend, see opposite page*).

Bands were constructed for the maxillary and mandibular first molars. To the left molar band a lingual extension was soldered to engage the premolars and the second molar. A double intermaxillary hook was soldered to this extension.

Twin arches without anterior bands were used for both arches. On the maxillary twin arch an intermaxillary spur was soldered to the end tube in the region of the left second premolar extending distally to engage the second molar. Intermaxillary rubbers were used from the buccal of the maxillary arch to the double intermaxillary hooks of the mandibular extension. When

these teeth were brought into occlusion, a mandibular twin arch with intermaxillary hooks was inserted. Then elastics were worn in a Class III arrangement.

The teeth are now in occlusion. Only with the combined surgical aid and orthodontic treatment could this be accomplished (Fig. 13*C*, *D*, and *G*).

In resecting the mandible, the surgical fracture is anticipated. Therefore, prior to the osteotomy, the splints are stabilized. This should include the wiring of each and every tooth in the maxillary as well as in the mandibular denture, thus distributing and increasing the anchorage and providing adequate immobilization, which is a favorable factor in callus formation. It is inadvisable to disturb the intermaxillary fixation at any time during fracture treatment. Therefore, the all-inclusive wiring increases the margin of safety against inadequate stabilization and also is of a considerable value as a preventive in open-bite sequelae.

In some situations, healing does not take place after the usual period of approximately six weeks. Then disappointment and fears of nonunion and hung jaw arise. Some may be inclined to consider the resection of failure. In reality it should be considered incomplete treatment. Under such circumstances, orthodontics could provide the necessary postoperative and follow-up treatment.

Case 14.—Female, aged 26, as a child had mumps, measles, scarlet fever, chicken pox and rickets.

She had no maxillary or mandibular molars. Her teeth were poorly shaped and grossly pitted (hypoplastic). The mandibular anteriors protruded 1 c.c. in advance of the maxillary anteriors (Fig. 14*C*, and *D*). The alveolar bone plates were thin. She presented an extremely prognathous mandible. Although the history of rickets was not revealed at the time of the operation, there was no doubt of the desirability for a resection.

In preparation for the surgical correction, the case was prepared for study with photographs (Fig. 14*A*, *B*, *C*, and *D*), roentgenograms, facial cast with maxillary and mandibular dental inserts.

Prior to the resection, bands were constructed for the maxillary and mandibular canines and second premolars, using 0.004 by 3/32 band material for the anterior teeth to insure retention of the ligature wire. To the lingual and the labial or buccal surfaces of the bands, spurs of 0.020 gauge wire were soldered. Winter arches were adapted to the maxillary and mandibular casts.

The bands were cemented on their respective teeth and the Winter arches were ligated to each and every tooth, using a double strand of 0.009 stainless wire.

The patient was then hospitalized and prepared for the resection. At the time of the osteotomy of the rami, the mandible was pushed back into normal occlusal relationship. With stethoscope tubing rubbers, the mandible was fixed to the maxilla through the spurs on the Winter arch.

In spite of the edema, her facial appearance was enhanced immediately. The result, undoubtedly, was due to the modified position of the mandible, the reduced gonial angle, and the new relationship between the upper and lower lips.

After the usual six weeks' period, the intermaxillary rubber fixation was removed. However, union had not taken place and there was the "hung" mandible. The intermaxillary elastics were replaced and continued for six more weeks. At the end of that period, union had not yet occurred. Nevertheless, the extent of the mandibular dropping decreased and general betterment was noticed (Fig. 14*F*).

The Winter arches were removed. The premolar bands were removed, buccal tubes soldered to them and then recemented. Labial appliances were constructed with intermaxillary canine spurs, both to the maxillary and mandibular appliances. These were ligated to all her teeth. Lighter intermaxillary rubbers were worn continuously in triangular arrangement in the premolar and canine regions only. She could then partake of a greater variety of diet. Satisfactory bilateral union occurred approximately nine months after the resection.

When the appliances were removed, there was a tendency for the mandible to drift mesially due to the absence of molar teeth. This was controlled through partial dentures made by her dentist to balance the occlusion. At our suggestion, he added a continuous labial spring to the mandibular partial denture (Fig. 14*E*).

Her facial appearance has maintained the improvement for three years following the resection. Despite the disappointment following the initial period of fixation, the patient is well satisfied with the results. Due to rampant decay, most of her teeth had to be extracted subsequently; nevertheless, the favorable aesthetic relationship of the mandible to the maxilla remained (Fig. 14*G*, *H*, and *I*).

SUMMARY

1. The gross dentofacial malformations presented included only cleft lip and cleft palate, ankylosis of the temporomandibular articulation, and the surgical correction of prognathous mandibles.

2. The orthodontic procedure in these conditions was part of an over-all plan, which included other surgical and dental specialties.

3. The orthodontic procedures, wherever and whenever possible, utilized orthodontic appliances in combination with restorations to supply missing teeth, or deficient or absent structures. Thus, the occlusion was corrected and at the same time provided mechanical substitutes for missing parts.

4. Whenever possible the treatment was aimed to correct the deformity, or to reduce the physical handicap, and thereby alleviate the mental suffering of the facial cripple.

In the treatment of gross dentofacial deformities, specialties other than orthodontics play an important and integral part. For his inspiring guidance, encouragement, and surgical skill, I am indebted to the late Carl G. Burdick, M.D., who was chief of the General Surgical Service, Hospital for Special Surgery, New York, N. Y., and whose kindness will always be remembered. For their splendid cooperation and skillful surgical coordination, I wish to express my gratitude to Fenwick Beekman, M.D., Bradley Coley, M.D., Norman Higenbotham, M.D., Yolande H. Huber, M.D., and Roland L. Maier, M.D., of the Hospital for Special Surgery, New York, N. Y., to Arthur S. McQuillan, M.D., and Leo Winter, M.D., D.D.S., of Bellevue Hospital, New York, N. Y. and David Tanchester, D.D.S., of Montefiore Hospital, New York, N. Y.

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57 WEST 57TH STREET

A FURTHER STUDY OF TWEED'S BASIC PRINCIPLES AND THE REDUCTION OF BIMAXILLARY PROTRUSION WITHOUT EXTRACTION

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I WISH to extend my sincerest thanks to your president, Dr. J. Camp Dean, for giving me this opportunity to discuss the treatment of bimaxillary protrusion. I am also indebted to Dr. Spencer R. Atkinson, who so kindly gave me the time reserved for his paper on the program. In the past, the reduction of bimaxillary protrusion has been accomplished by the reduction of tooth material, and, today, it is considered very good practice to remove four premolars to facilitate the establishment of a more desirable facial profile, of course, from the point of view of esthetics.

It is entirely fitting that we discuss this important problem in an unbiased manner and try to see whether the reduction of bimaxillary protrusion could be accomplished without resorting to extraction. I am sure you will agree with me that, if the same final results could be obtained, the removal of four sound teeth would not be necessary.

We all recognize the fact that the orthodontic profession is divided into two groups at the present time. One group believes that a very large number of cases cannot be properly treated without reducing the tooth material by extraction, while the other group maintains that such a procedure is entirely unwarranted. These different beliefs are based on past experiences and are supported by abundant evidence on both sides. In the evaluation of these experiences it is impossible to maintain an impartial attitude, and the fact is invariably overlooked that there is some truth in each of the opposing points of view. Our attitude is always conditioned by our past experiences, and also by the way we interpret those experiences. Differences of opinions arise as a direct result of these interpretations and the premise upon which we base our reasoning. The premise, on the other hand, is conceived in conformity with an adopted standard, which is used in the evaluation of the observed conditions and relationships. The acceptance or the rejection of the premise by an orthodontist determines whether he belongs to one group or to the other.

In deciding upon the proper procedure, we set up certain standards which we use to make comparisons with the abnormalities. The degree of deviation from the standard determines the degree of the deformity, so that the greater the deviation, the more severe the deformity. From the degree and character of the deformity, we make our decision regarding the mode of treatment. It so happens that the two groups into which the profession is divided use different standards of comparison, and the differences of opinions arise as a direct result of these different standards. It is clear that if the work of one group is judged by the standards set up by the other group the result will invariably be a sharp disagreement.

Read before Pacific Coast Society of Orthodontists, San Francisco, Calif., Feb. 25, 1947.

In order to avoid misunderstandings, I shall discuss the standards set up by the extractionist group, and shall try to establish a uniform set of conditions by which we may judge existing deformities. I use the word deformities advisedly because primarily we are dealing with bone deformities, and malocclusions are the recognizable manifestations of these deformities. In the discussion, it becomes important to set up standards acceptable to both groups, but, inasmuch as the extractionist standards are already firmly established, it becomes necessary to state clearly how much of this may be acceptable to the nonextractionist group. I wish to make it clear at the outset that I belong to the nonextractionist group.

This is a controversial subject, and I shall endeavor to handle it in the spirit of give and take, without making a personal issue of a scientific problem. The very nature of the problem compels me to question some of the theories advanced to justify extraction, and I shall offer well-grounded reasons for their rejection. On the other hand, many of the extractionist's arguments are true and acceptable, and I shall indicate clearly which arguments we can agree with. I bring you criticisms which I hope will be constructive; at the same time, I know I shall expose myself to your criticism. I only hope that we will be able to carry this along purely scientific lines without making a personal issue out of it. You may, however, question any scientific statement I may make, for I am confident that I have sufficient facts to support it. In return, I ask you to grant me the privilege to discuss this problem freely and to place the burden of proof on the proper individuals or group of individuals, who may be responsible for statements made in the past which may have wrongly influenced your own opinions. The foremost exponent of the extractionist group is Dr. Charles H. Tweed of Tucson, Arizona. He has defined the standards upon which he based his reasoning and from which he evolved a distinctive method of treatment. His teachings are very widely accepted, and in the past five or six years brought about a sharp division of professional opinion. The final acceptance of his work must, of necessity, depend upon the correctness of the premise based upon those standards. They may be briefly stated as follows:

1. Normally, the mandibular incisors are in an upright position over the medullary (basal) bone.

2. Practically all malocclusions are characterized by a forward drift of the teeth in relation to the medullary bone.

3. If the mandibular anterior teeth are placed upright on the medullary bone, the result will be more stable. (If necessary, we must resort to extraction.)

4. In a large percentage of cases, facial balance cannot be obtained without resorting to extraction.

From this it is clear that Dr. Tweed's standard is the upright position of the mandibular incisors over the medullary bone. There are two important factors involved in the establishment of this standard. The first factor is the upright position of the incisor teeth, while the second factor is the relationship of the incisor teeth to the medullary structure. Even if the incisors are in an upright position, the dentition is not considered normal unless the anterior teeth are

positioned directly over the basal bone. When this relationship does not exist, the dentition is considered to be in protrusion, and, according to further observations, the dentition is too far forward in nearly all malocclusions.

Accordingly, Dr. Tweed bases his reasoning on the premise that for successful results the mandibular incisors must be uprighted, and in order to establish good facial balance the entire dentition must be moved distally. But, inasmuch as it is considered impossible to move the dentition distally, it becomes necessary to extract one premolar on each side of each jaw, which will provide space for the distal movement of the anterior teeth. In this manner we may accomplish both objectives.

Here, the question arises whether the standards set up by Tweed are correct and acceptable. Let us examine each point separately.

1. Is it true that in the untreated normal the mandibular incisors are upright over the medullary bone?

In order to study this question, it becomes necessary to define what is meant by the word "upright." It may mean vertical, which is perpendicular to the plane of the horizon, or it may mean perpendicular to some other line or plane. At any rate, upright means perpendicular to some plane of reference. Without defining the plane of reference, the word "upright" is meaningless. Tweed very clearly defined his plane of reference in his paper entitled "Indications for the Extraction of Teeth in Orthodontic Procedure," which was read before the American Association of Orthodontists in April, 1944. In explaining Fig. 1, he states:

"To aid you in correctly interpreting the illustrations, a few words of explanation pertaining to the sectioned models are necessary.

"The bases of all these models are cut parallel to the occlusal plane. Whenever the profile of the patient appears with the sectional model, note the positions and inclinations of the mandibular incisors with relation to dental base and correlate the positions of these teeth with facial aesthetics."

Thus, it is made very clear that when the mandibular incisors are spoken of as being upright, the long axes of these teeth are perpendicular to the occlusal plane. This understanding of the word upright is further confirmed by another one of Tweed's illustrations (Fig. 2), which shows this normal variation of minus 5 to plus 5 in the axial inclination of the mandibular incisors. It is not stated in what units the values minus 5 and plus 5 are expressed, but we may take it for granted that they are angular units and represent degrees. From these two illustrations we may draw the conclusion that Tweed considers the axial inclination of the mandibular incisors abnormal if the deviation from a perpendicular to the occlusal plane is more than plus or minus 5 degrees. Furthermore, it is clearly illustrated by Fig. 3 that Dr. Tweed treats his cases in accordance with this concept.

In order to firmly establish the upright position of the mandibular teeth as normal, the following evidence was presented in the same article as a footnote:

"For years I have contended that in normal occlusion the mandibular incisors are always positioned in an upright position on mandibular basal bone;

that normals do present a variation in the axial inclination of the mandibular incisors but that this variation falls within the minus 5 to plus 5 range—0 being vertical and upright.

"To the best of my knowledge, Dr. H. Margolis was the first to relate the mandibular incisors to the mandibular plane to create what he has termed the

Fig. 1.—From Tweed, Charles H.: Am. J. Orthodontics and Oral Surg. 31: 74, 1945.

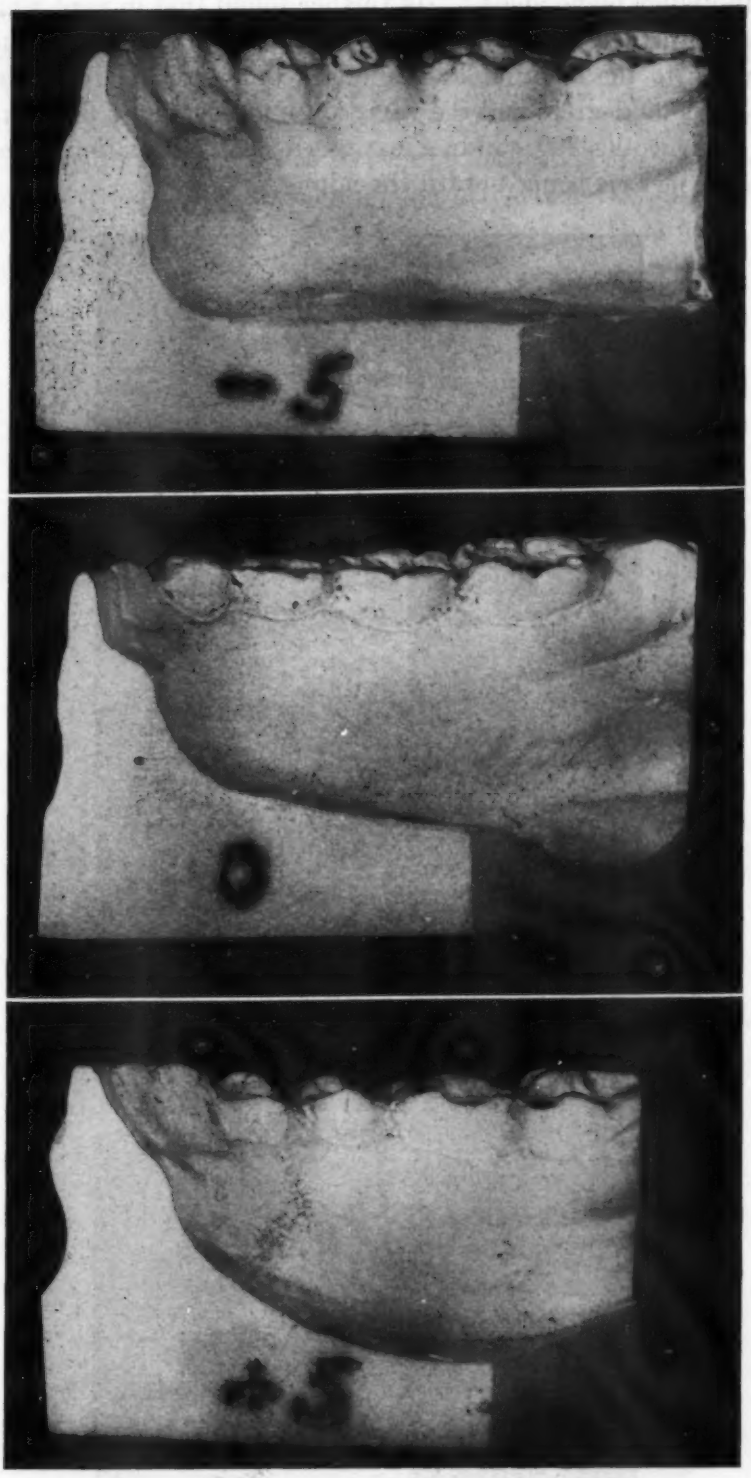

Fig. 2.—From Tweed, Charles H.: Am. J. Orthodontics and Oral Surg. 31: 74, 1945.

'incisor mandibular plane angle.' He further found that in most white children with normal dentitions and nonprognathous faces the mandibular incisors were at right angles to the mandibular plane and therefore the incisor mandibular plane angle was 90 degrees and the variation was less than 5 degrees either way in 90 per cent of the 300 children examined. Any variation from the right angle in this type face being toward the minus."

Fig. 3.—From Tweed, Charles H.: Am. J. Orthodontics and Oral Surg. 30: 405, 1944.

This, then is the evidence offered to prove that the uprighting of the mandibular anterior teeth is a justifiable procedure. In the examination of Margolis' paper, it will be found that the long axis of the mandibular central incisor is approximately perpendicular to the mandibular plane. The mandibular plane is a plane formed by the right and left lower borders of the mandible. A detailed study will reveal that the mandibular plane is never parallel to the occlusal plane. The angle made by these two planes varies from 9° to 20° in the normal, as shown by Margolis' illustrations (Figs. 4 and 5).

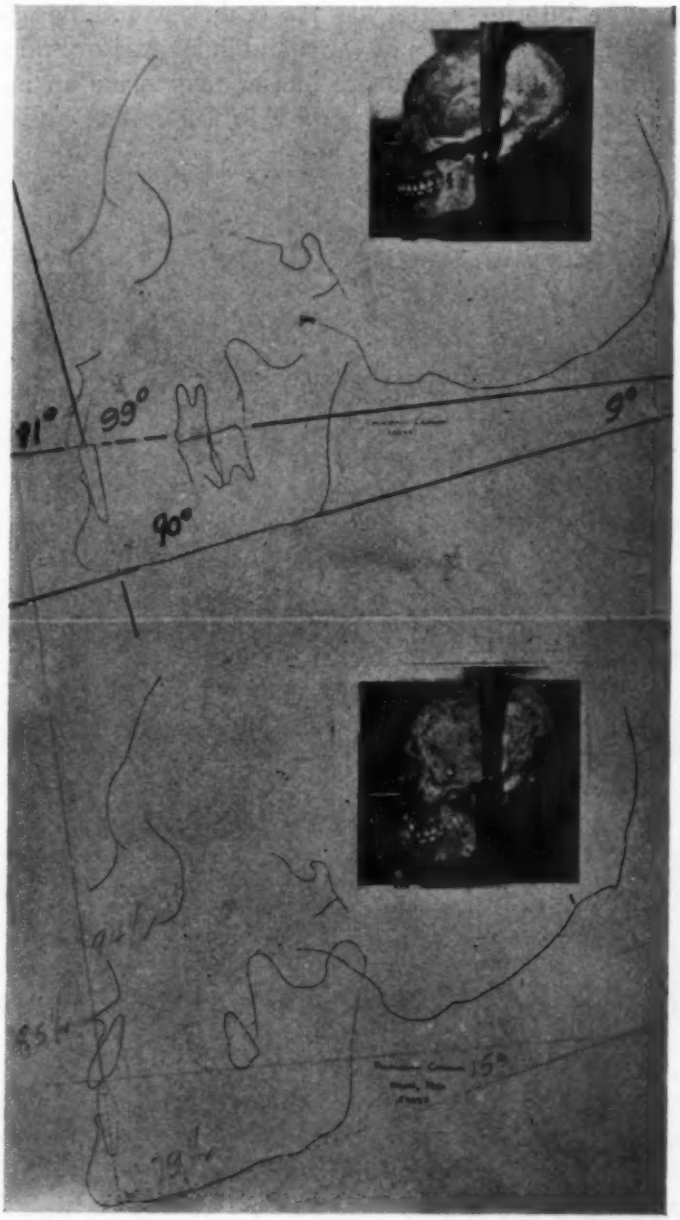

Fig. 4.—From Margolis, Herbert I.: Am. J. Orthodontics and Oral Surg. 29: 571, 1943.

But, if the occlusal and mandibular planes are not parallel, then the angle formed by the long axis of the mandibular incisors and the occlusal plane must always be more than 90°, provided of course, that we accept Margolis' findings regarding the axial inclination of the mandibular incisor. The amount of procumbency can be measured in degrees by adding the occlusomandibular angle to the right angle. This is dictated by an important proposition in geometry, namely that "an exterior angle of a triangle is equal to the sum of its two opposite interior angles." The exterior angle is the angle formed by the long axis of the mandibular incisor and the occlusal plane, which appears as a line on the illustration. The interior angles are the occlusomandibular angle and the right angle formed by the long axis of the mandibular incisor and the mandibular plane. Accordingly, the mandibular incisor may make an angle with the occlusal plane as large as 110° (20° plus 90°) in the normal individual. Here,

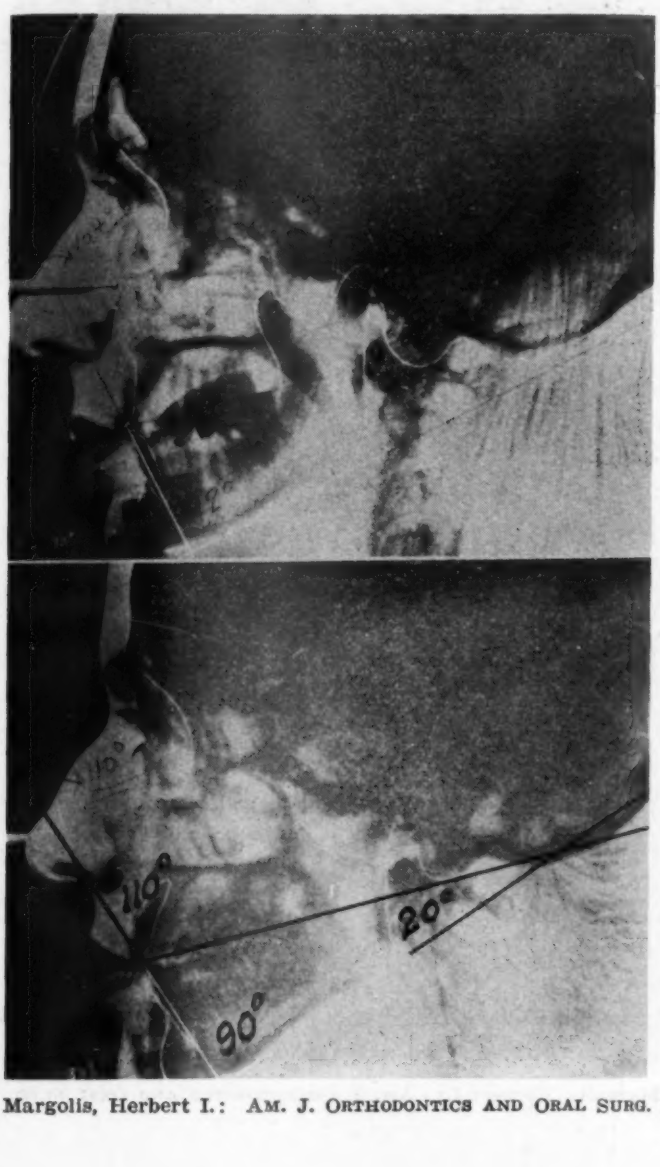

Fig. 5.—From Margolis, Herbert I.: Am. J. Orthodontics and Oral Surg. 29: 571, 1943.

it is important to note that Margolis offers Fig. 5 as a beautiful normal, with an incisor-mandibular angle of 90° and an incisor-occlusal plane angle of 110°. In the legend, he states, "Excellent profile; incisors vertical. This woman used to pose for a nationally known illustrator. Incisor mandibular plane angle 89.5 degrees." Now, if this is the normal, it is at variance with Tweed's original premise. The only thing I find in common is that they both used the word upright, but they used different planes of reference. Both Tweed and Margolis owe an explanation to the profession in which it must be clearly stated just how these two different ideas were fused into one. We must remember that Margolis disproves Tweed's original premise. The disturbing thing is that Tweed accepts Margolis' findings and quotes him to justify his method of treatment; but he does not modify his treatment in accordance with the proof he

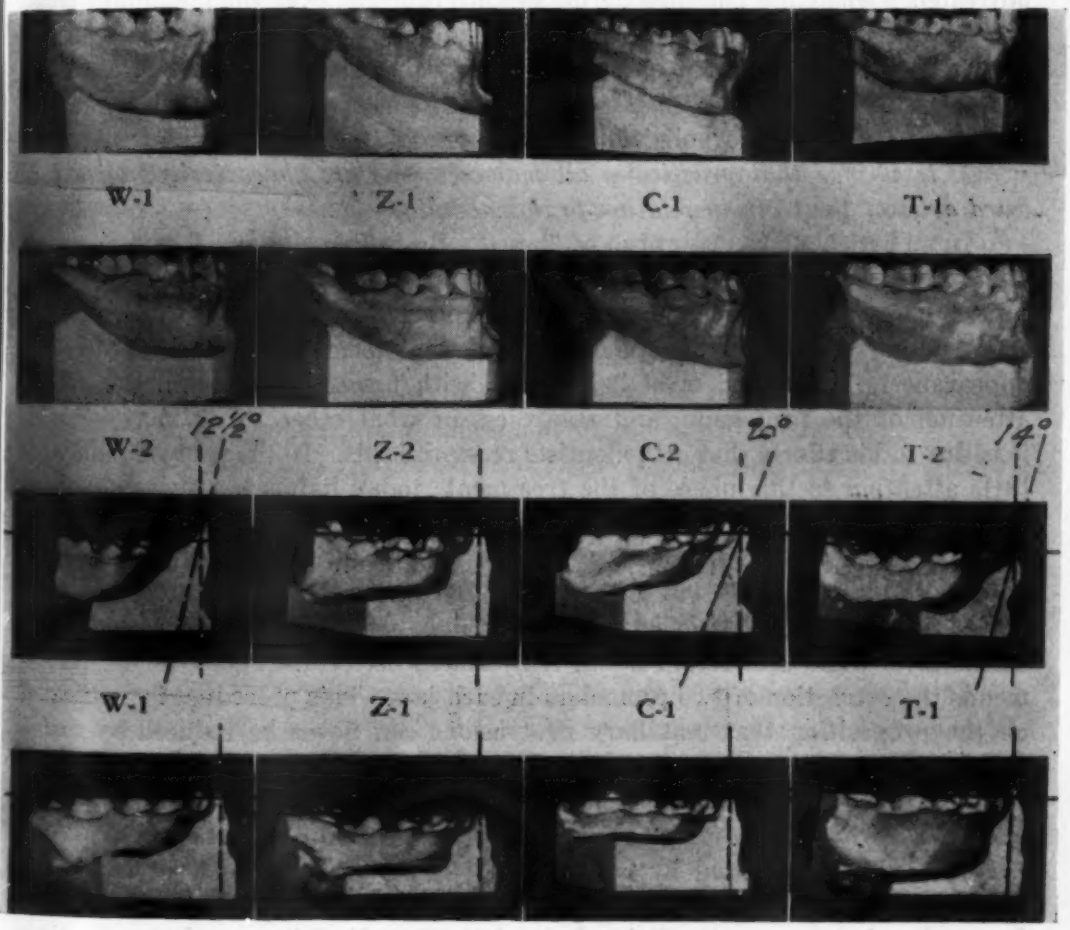

Fig. 6.—From Tweed, Charles H.: The Angle Orthodontist 11: 5, 1941.

presents. Tweed arranges the mandibular incisors at right angles to the occlusal plane, as shown by Fig. 6, and there can be no question about this. In the light of Margolis' findings, the axial inclination of the mandibular incisors may have been normal before treatment, for they do not exceed the maximum found in the normal.

This is a serious error in positioning the mandibular incisors. The condition held out by Tweed as a desirable objective in treatment appears to be a deformity if Margolis' findings are true. On the basis of such evidence, none of us has the moral right to order the extraction of four sound teeth. We must regard a procumbency of 110° as normal, which is 20° greater than that proposed by Tweed. If we further consider that Margolis' figures are based on figures obtained from some three hundred nonprognathous white children, it still remains to prove that normally all white children are nonprognathous. If this cannot be proved, then even a greater procumbency than 110° may be considered normal, which will certainly do away with the myth of the upright mandibular incisors.

Therefore, our conclusion must necessarily be that it is *not true* that in the untreated normal the mandibular incisors are upright over the medullary bone. For this reason I beg you not to use this as a basis of comparison with the cases I am about to show. That standard I have conclusively proved not to be acceptable. For the want of a better standard of comparison, I propose that we provisionally accept Margolis' finding; it appears to be nearer the truth.

2. *Is it true that practically all malocclusions are characterized by a forward drift of the teeth in relation to the medullary bones?*

In an article, "An Appraisal of Tweed's Basic Principles," I have accepted this statement to be true, with the reservation that, after correction, natural processes very often reduce the maxillary protrusions. In many instances, however, self-correction may not take place and the finished cases have a protrusive appearance. Dr. Tweed must be credited with forcefully bringing this to the attention of the profession, and regardless of what other things may be said, it is due to his efforts that orthodontists recognize this. In the past we paid very little attention to this phase of the treatment; today it forms a very important part of it.

I heartily agree with Dr. Tweed that this condition characterizes a large number of malocclusions, but I differ with him on the method of correction. Dr. Tweed is convinced that it is impossible to reduce such protrusions by orthodontic means and still retain a full complement of teeth. Therefore, he recommends the extraction of two premolars in each jaw. This procedure is predicated on the proposition that maxillary protrusions can never be reduced by orthodontic means. This attitude has a limiting effect on progress. If we subscribe to these views, we immediately assert that maxillary protrusions can never be reduced without resorting to extraction. Accordingly, since nearly all malocclusions are characterized by a forward drift of all teeth over the medullary bones, it becomes necessary to extract four teeth in almost every case, and this is exactly what happened. It is admitted by Tweed's followers that extractions are recommended in more than 75 per cent of all cases.

This attitude is a direct result of the belief that maxillary protrusions can never be reduced by orthodontic means. It is true that this has not been accomplished in the past, but from what follows it may become a routine procedure in the future. It would be far better to say that the reduction of maxillary protrusion has never been accomplished. This leaves the door open for

further research and study. If we just say that it cannot be done, then further research will not be necessary, and it will not be done. This is a far more satisfactory outlook, and it may mean that in time we will be able to solve this problem to everyone's satisfaction, and then abandon the practice of extracting four sound teeth from the mouths of our patients.

3. *Is it true that if the mandibular anterior teeth are placed upright on the medullary bone, the results will be more stable?*

Taking into consideration the fact that most malocclusions are characterized by a forward drift of all teeth, the correction of such deformities may place the anterior teeth more forward on the basal structures. Under such conditions, it may be possible that the corrected dentition remains under strain and the result will not be stable. In order to preserve the stability of the corrected dentition, the removal of four premolars is recommended. By doing this the anterior teeth could be brought well over the basal bones, but this also results in the reduction of interproximal pressure. The reduction of interproximal pressure is always followed by the loss of interproximal contact, which may follow extraction in a large number of cases.

In order to guard against relapse in the posterior region, Dr. Strang recommends that "we avoid changing the width of the deformed denture to any great degree." He has explained that the widening of the arches disturbs the balance of the forces which were in equilibrium in the original malocclusion. It is further pointed out that sufficient space for the locked-out teeth may be obtained in three ways (Fig. 7):

1. By the forward movement of the incisors.
2. By the lateral movement of the buccal teeth.
3. By the distal movement of the buccal teeth.

Denture enlargement by the forward movement of the incisor teeth or by the lateral movement of the buccal teeth is not recommended because it would result in the alignment of the teeth off the medullary bones. Dr. Strang agrees that "the one way that these important factors can be preserved in gaining space from molar to molar is by moving the buccal teeth backward. But it has been proved by clinical tests and also with cephalometric radiograms that the ability to move teeth distally is extremely limited. Consequently, there is no way available to provide additional space anterior to the molar teeth for blocked-out and rotated dental units except by moving the incisors off their osseous base and shifting the buccal teeth laterally against powerful antagonizing muscular tissues, and also off their supporting basal bone. What then is the common-sense answer to this problem? Is it not the reduction of the number of tooth units and utilizing the space thus provided for the corrective procedures that are required?"

Dr. Strang's explanation of what happens when malocclusions are corrected without extraction indicates that the corrected malocclusions are nearly always off the bony base. We all agree with that opinion. The extractionist's point of view is justifiable on the ground that we have never been able to move an entire dentition distally, and correct treatment demands that this be done.

Here, again, we must point out that extraction is resorted to because we have never been able to move the entire dentition distally, and it is taken for granted that we shall never be able to do so. From Dr. Strang's paper we may infer, however, that if the buccal teeth could be moved distally, the mandibular incisors could be placed in an upright position over the medullary bone; and, therefore, the extraction of four teeth would not be necessary.

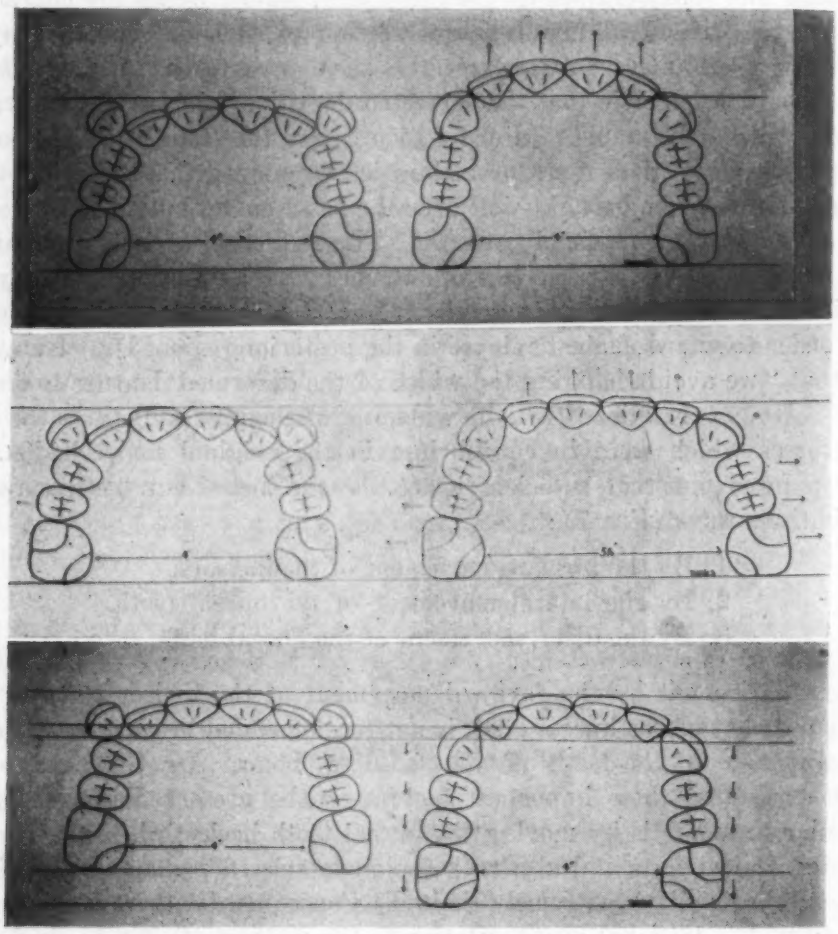

Fig. 7.—From Strang, Robert H. W.: Am. J. Orthodontics and Oral Surg. 32: 313, 1946.

It must be admitted that the stability of the corrected dentition would be better if the tooth material were reduced by extraction. But this is due to the reduction of interproximal pressure and not to the uprighting of the anterior teeth. Furthermore, if we follow Dr. Strang's advice and do not widen the arches in the posterior region, there will be no relapse. But we must also keep in mind that there will be no relapse in that event, because we have not moved the teeth; for if the teeth have not been moved, they do not have to readjust themselves. It seems that the main efforts in treatment are directed toward the anterior section and the posteriors are left alone.

The uprighting of the anterior teeth may be accomplished if the tooth material is reduced; but it is still an open question whether this is desirable or necessary. The loss of interproximal contact will surely take its toll; the harmful effects may not be evident for many years after the completion of orthodontic correction. The stability of the anterior teeth may be better, but it must necessarily be extremely difficult to prevent the formation of spaces between the teeth with the complete loss of approximal contact.

4. *Is it true that, in a large percentage of cases, facial balance can be obtained only if we resort to extraction?*

We have seen that the real reason behind extraction is that it is held impossible to move an entire denture distally. The orthodontic interference is limited to the movement of the anterior teeth. The posterior teeth are left alone.

During the attempt to close the spaces created by the removal of the first premolars, the anterior teeth are moved backward. While a definite effort is made to keep the posterior teeth from coming forward, a forward movement of those teeth is inevitable. Thus, the space created by extraction is closed partly by the distal movement of the anterior teeth and partly by a mesial movement of the posteriors. Therefore, only a part of the available space can be utilized for the reduction of protrusion. This was proved to be the case by Dr. Allan G. Brodie. In his article entitled, "Does Scientific Investigation Support the Extraction of Teeth in Orthodontic Therapy?" he says, "In those cases in which extraction has been resorted to, it has been demonstrated that the molars are brought forward to a considerably greater degree than the incisors taken back. The latter teeth have been shown to behave as two armed levers with their apices going farther forward than their original position."

According to this, the amount of distal movement of the anterior teeth is relatively small as compared with the available space. Yet the improvement in profile is very noticeable (Figs. 8, 9, 10, 11 and 12). This leads to the conclusion that the reduction of maxillary protrusion requires a comparatively small distal movement of the denture.

This being the case, the question arises whether it is possible to devise a method by which we can move the denture distally the required amount, disregarding the fact that, at present, it is held to be impossible.

If we examine the problem in detail, it will become clear that there is nothing in our past experiences telling us that this cannot be done. Let us consider a full maxillary arch. I remember the time when Dr. J. Lowe Young stated before the First District Dental Society "it is impossible to move a first molar distally." Today, we can move a first molar distally without much difficulty. We have appliances which move all the posterior teeth on one side distally. I published the construction of such an appliance about two years ago. Case reports were read before the New York Society of Orthodontists of two patients treated at our clinic at the Hospital for Joint Diseases by Dr. S. H. Stein. This indicates that the distal movement of the first molars is not an impossibility. But if we can move the first molars distally, we can move any molar tooth backward, and it requires no proof that the premolars and the anteriors can also be brought back. What then, is the reason for our failure to

accomplish the distal displacement of the entire denture? The explanation can be found in the fact that we tried to move the posterior teeth back first, and after that was accomplished, we made an effort to follow it up with the premolars and the anteriors.

We failed in this attempt because we invariably used the molars to move the anteriors and the premolars distally. Since all teeth move forward with much greater ease, in the second part of the treatment, we accomplished exactly what Dr. Brodie has pointed out in regard to the space created by the extraction of the first premolars. The molars came forward almost the entire amount

Fig. 8.—From Brodie, Allan G.: Am. J. Orthodontics and Oral Surg. 30: 444, 1944.

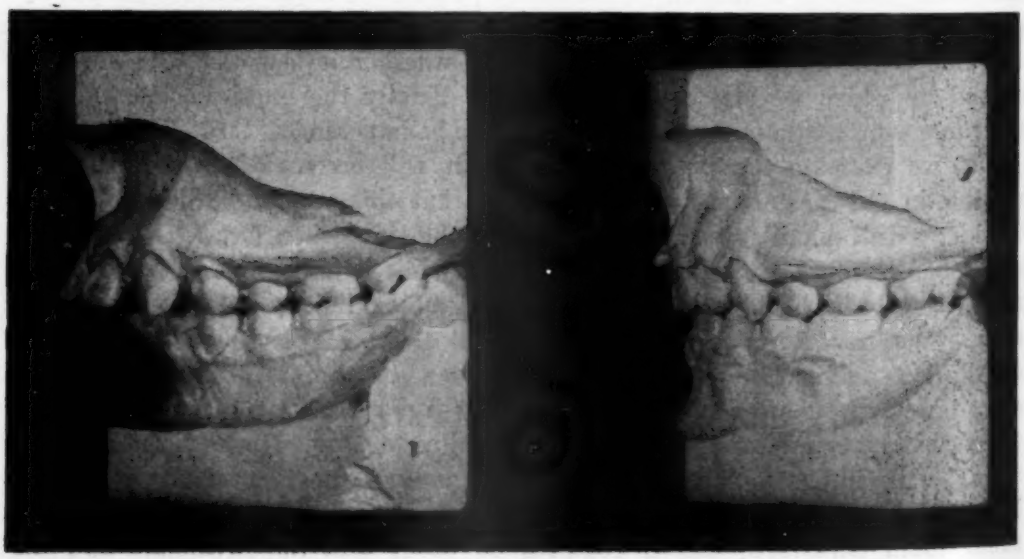

Fig. 9.—From Brodie, Allan G.: Am. J. Orthodontics and Oral Surg. 30: 444, 1944.

they were pushed back, so that the final gain toward the reduction of maxillary protrusion was very slight. From what follows, it will appear that the distal movement of the molars is the proper procedure only in cases where a canine or a premolar is blocked out, but is an incorrect approach for the reduction of maxillary protrusion as a whole.

Fig. 10.—From Brodie, Allan G.: Am. J. Orthodontics and Oral Surg. 30: 444, 1944.

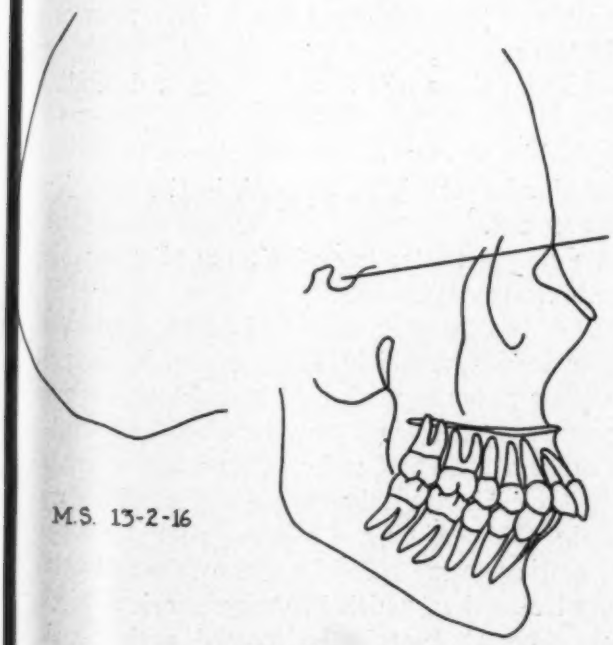

Fig. 11.

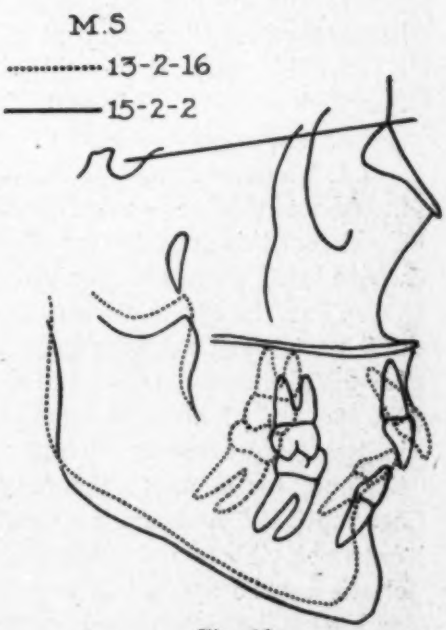

Fig. 12.

Fig. 11.—From Brodie, Allan G.: Am. J. Orthodontics and Oral Surg. 30: 444, 1944.
Fig. 12.—From Brodie, Allan G.: Am. J. Orthodontics and Oral Surg. 30: 444, 1944.

In order to correct maxillary protrusion, the mass movement of the entire upper or lower denture seemed to be the only solution. While studying this problem, it became evident that forces in excess of what we have been using have to be applied. The amount of force required to move the denture distally must be at least equal to the sum of the forces required to move each individual tooth separately in that direction. Then the mode of application of that force became a problem. It was necessary to find out if the application of such great force would not cause the devitalization of teeth, or set up necrotic areas at its site of application. This whole problem was looked upon as a final step in the treatment of malocclusion, and it was assumed that it can be accomplished after the active tooth movements have taken place.

It also became clear at once that intraoral anchorage cannot be used. The reason for this is the fact that, in intraoral anchorage, there is a reciprocal reaction between the teeth, and while some teeth are pulled backward, others are brought forward. Since mesial movement is more readily accomplished, intraoral anchorage will always have a tendency to increase the protrusion. And this is what Tweed and others have observed. It must be stated that this observation is absolutely true.

In the use of extraoral anchorage, the reciprocal action is between a number of teeth and a point outside the mouth. It was further realized that, in order to produce a mass movement, the appliance must be so designed that the distal force would act on all the teeth at the same time.

Following this line of reasoning, the character of the appliance began to take shape. From this, it became apparent that:

1. The appliance must be capable of delivering a greater force than ever before used for the movement of the teeth.
2. This must be so accomplished that there will be no danger of devitalization.
3. The appliance must be activated by an extraoral force.
4. The force must be delivered simultaneously to all teeth in the same jaw, in order to produce a mass distal movement.

From this specification, it was a simple matter to evolve an appliance which would bring about the required tooth movements.

Thus, the appliance must consist of two parts, an extraoral part and an intraoral part. The extraoral part is the headgear, which has been used in the past for distal movement; but the elastic force was so weak that it could not produce the amount of distal movement required. The headgear, therefore, is modified in two main respects. First, an arrangement had to be worked out to enable the operator to apply the force in the right direction in each case. This was accomplished by designing a cap (Fig. 13) consisting of a center part of a strong four-inch ribbon, and a substantial netting on the two sides. Thus, the activating elastic can be applied in any desired direction, which in every case is different and must be determined by trial. Second, the elastic, instead of being the usual rubber band, is made of a strong silk-covered elastic ribbon fitted with a hook and a slip lock. By this means the direction and intensity of the elastic pull can be very efficiently controlled.

Fig. 13.—Improved headgear.

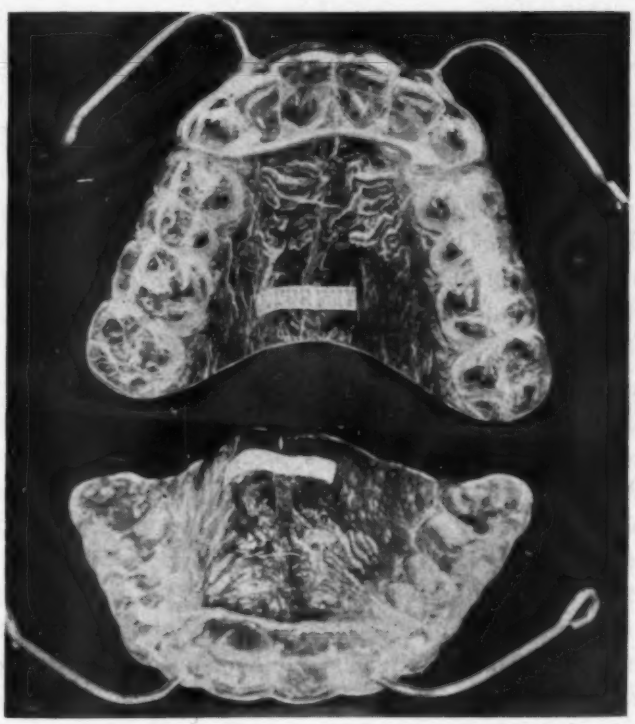

Fig. 14.—Acrylic splint for the mass distal movement of maxillary teeth.

The intraoral part of the appliance (Fig. 14) consists of an acrylic splint which covers the palate and the lingual and occlusal surfaces of the posterior teeth. The incisal portion of all anterior teeth is also covered. The plate is carried over the incisal and occlusal surfaces to cover the labial and buccal surfaces of all teeth to a depth of 1.5 to 2 millimeters. This is a splint which binds the teeth together into an unalterable group. To this plate, a 15-gauge round, hard, stainless steel wire is added. It is carried lingually behind the anterior teeth, then brought buccally between the canine and the first premolar on both sides; each end then is bent forward along the incisal edges of the canine and lateral incisor; then it is recurved to pass out of the mouth at the lip line and point distally toward the elastics. The end of the wire on each side is bent into a loop of proper size to receive the hooks attached to the elastics. By the proper manipulation of the elastics, the required force may be delivered to the entire denture at the same time, and thus produce a distal movement. In the construction of these appliances, care must taken to place the wire in such a position that it will not disturb the rest position of the lip, and as it emerges it must be well in advance of the corner of the mouth; otherwise sores will develop.

From the point of view of mechanics, this is an ideal arrangement and it is quite different from the earlier attempts. In all the earlier designs, the germ of the idea was there but it was not properly applied. The headgear was one of the first orthodontic appliances in use, but it was not used universally. In recent years, the interest in occipital and cervical anchorages was revived, but the application was not too definite. Here it must be remarked that we have no choice between cervical or occipital anchorages. The direction of elastic pull must always be parallel to the occlusal plane, or directed slightly above it. There is a great variation in the required direction of the elastic pull.

The question arises whether the arrangement just described is capable of reducing maxillary protrusion. The answer to this question is easily found in the results which were obtained by the use of this appliance. The response was so definite that there could be no doubt regarding reduction of maxillary protrusion. It was definitely accomplished without resorting to extraction.

In the treatment of Class 2, Division 1 cases, and also Division 2 cases, a good deal of difficulty was experienced by all of us. The use of intermaxillary elastics produced only temporary results, and, in many instances a dual bite was established. We were all aware of the fact that in such instances the entire maxilla was too far forward, but we did not have the means to correct it. By the use of this appliance, the maxillary protrusion can be very easily reduced. The proof of this taking place is found in the fact that the persistent use of this appliance eliminates distal occlusion. In other words, in this instance the distal occlusion is corrected by the distal movement of the entire maxillary arch and not by the forward positioning of the mandible. There can be no doubt regarding the distal displacement of the maxillae. In these cases, although there was no reciprocal action between the maxilla and the mandible, the distal occlusion was corrected. At the same time, the maxillary protrusion completely dis-

appeared, establishing a very acceptable and desirable profile. But in order to correct a distal occlusion, the entire maxilla must be displaced distally more than one-half the width of the buccal cusps of a lower molar tooth, which is more than two millimeters. In some instances, it was possible to drive the upper teeth beyond the normal occlusal relationship. The question may be asked, therefore, "Is it necessary, at any time, to resort to extraction for the correction of maxillary protrusion?" Taking into consideration the marked improvement in facial profile of the patient presented by Dr. Brodie, and the very slight distal

Fig. 15.

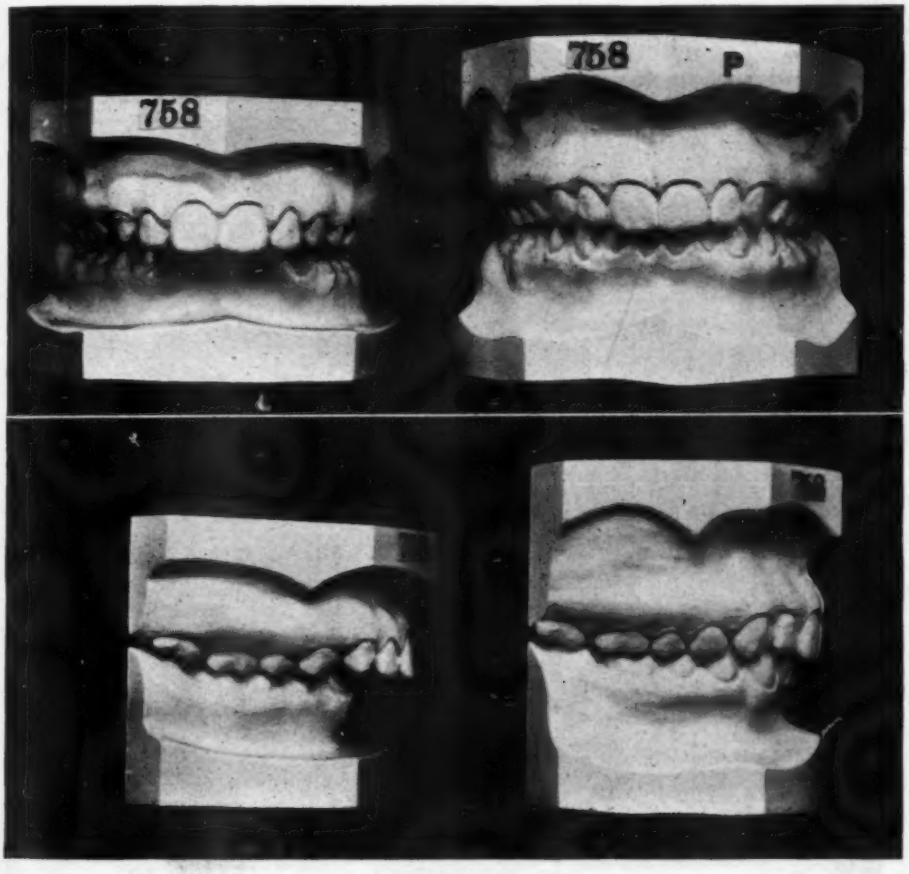

Fig. 16.

Fig. 15.—Case 1. Front view before and after treatment.
Fig. 16.—Case 1. Right lateral view before and after treatment.

movement of the anterior teeth even after the removal of four good teeth, the conclusion must be that maxillary protrusions can be reduced without extraction in nearly every case. The results obtained by the new method just described are much better from the point of view of occlusion, and the facial improvement is equally as good. Therefore, we can state with all assurance that it is not true that in a large percentage of cases facial balance can be obtained only by resorting to extraction.

It seems to me that in the treatment of Class II, Division 1 cases, after the arches are equalized, normal arch relationship can be permanently established by the distal displacement of the maxillary arch. In Class 1 cases, the corrected dentition very often has a protrusive appearance, both in the mandible and in the maxilla. In these cases, the mandibular protrusion can be surprisingly easily corrected by the use of Class 3 elastics. This is contrary to the method of procedure all of us have been following. We have endeavored to reduce the maxillary protrusion previously by employing Class 2 elastics. By reversing the elastic pull, the protrusion of the lower anterior teeth can be reduced, while the maxillary protrusion is corrected later by the new method. The results are very gratifying.

Fig. 17.

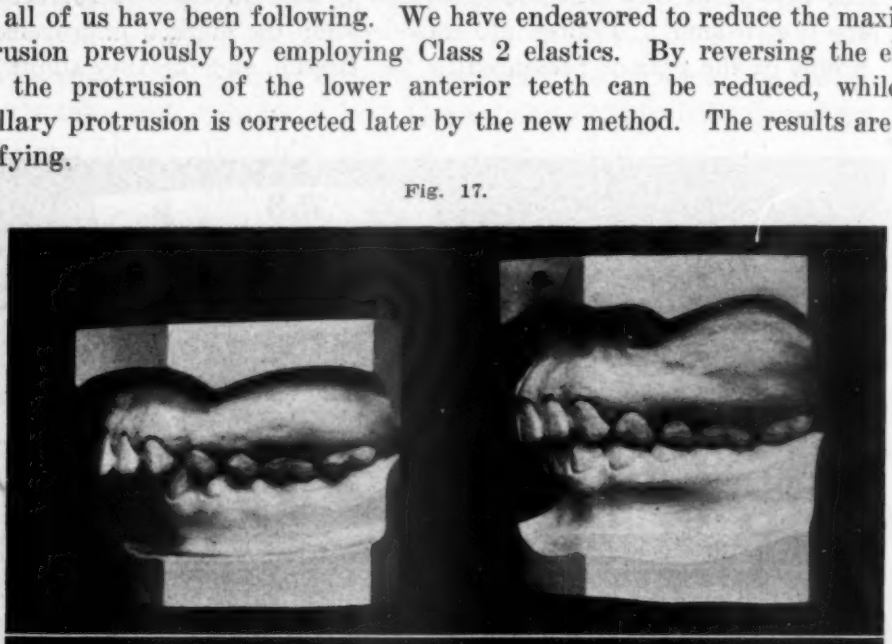

Fig. 18.

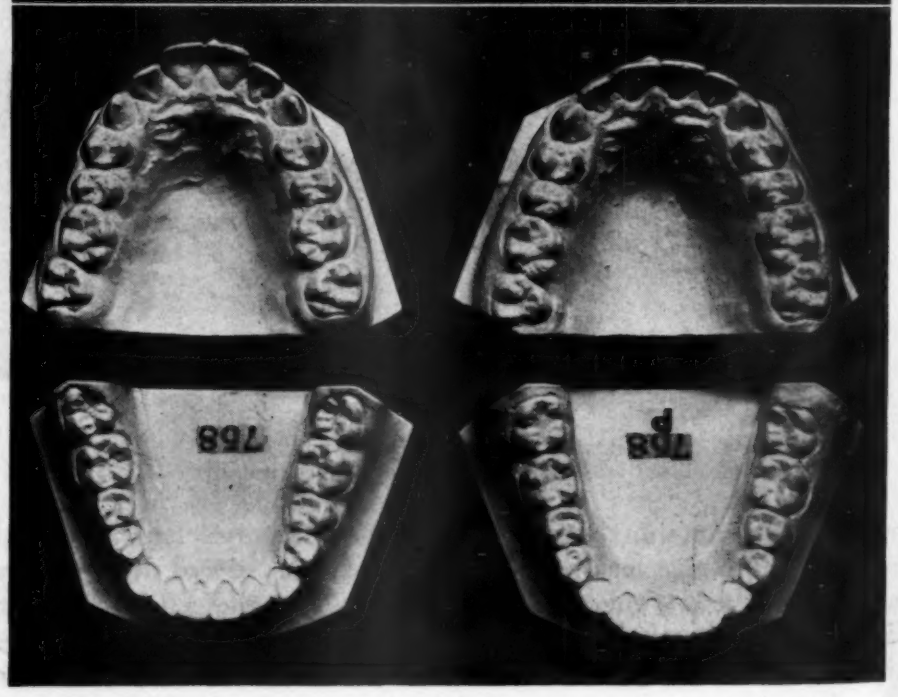

Fig. 17.—Case 1. Left lateral view before and after treatment.
Fig. 18.—Case 1. Occlusal view before and after treatment.

To show the extent of the corrections obtained by this method I have selected two cases which I could not correct by the usual application of intermaxillary elastics. Intermaxillary elastics were used in these cases but without success.

CASE 1.—This case (Fig. 15) was treated with upper and lower labial appliances, which were inserted on Sept. 30, 1944, and Oct. 6, 1944, respectively. The condition was corrected in nine months and upper and lower bite retainers were given to the patient on July 26, 1945. These were worn all the time during the first three months, and after that during the night only. The distal relationship was again re-established and the condition was as bad as it was at the beginning. On May 1, 1946, a maxillary distal movement splint was inserted and the result is shown by the progress models (Figs. 16, 17, and 18), the impressions for which were taken on Feb. 6, 1947.

Fig. 19. Fig. 20.

Fig. 19.—Case 1. Front view after treatment.
Fig. 20.—Case 1. Left profile view after treatment.

Note the good occlusal relationship on both sides, and also the change in the axial inclination of the anterior teeth. This is accomplished by an upward pull of the elastics. It still remains to be shown that such positioning is desirable. The full face and left lateral photographs indicate that there is no protrusion of the upper teeth. (Figs. 19 and 20.)

CASE 2.—This is a Class II, Division 2 case (Fig. 21) which gave me a good deal of difficulty. On the advice of the family dentist the impacted lower third molars were removed on April 28, 1942.

Modified edgewise appliances were inserted on Nov. 4, 1942, and were removed on June 15, 1943, making the active period only eight months. This was followed by labial appliances and intermaxillary elastics for three months.

On Oct. 12, 1943, upper and lower bite retainers were inserted with the result that the bite was opened but there was a complete relapse of the distal relationship. This, however, was completely corrected by a maxillary distal movement splint which was inserted on March 12, 1946. Impressions for the finished models were taken on Jan. 28, 1947. Figs. 22, 23, and 24 show the beautiful result obtained in this case. Note the complete reduction of the distal relationship and of the excessive alveolar protrusion. Note also the change in the overbite, and, in the axial inclination, of the anterior teeth. This, perhaps, is the most significant case I showed. It is significant for three very good reasons:

1. Because the case failed after the usual treatment of repositioning the mandible.

Fig. 21.

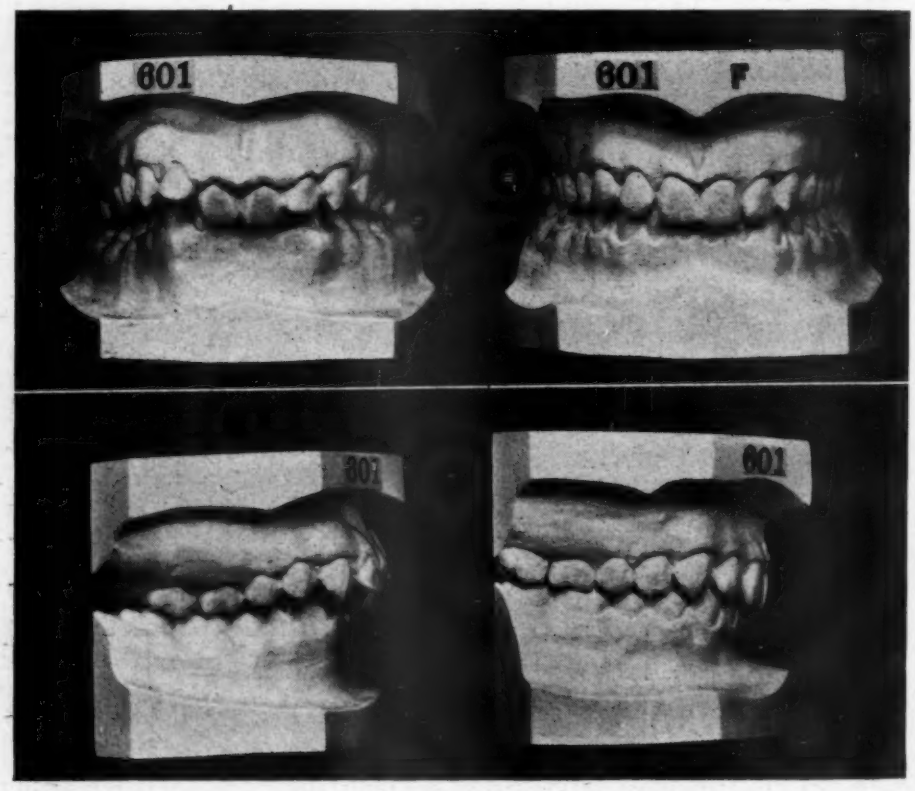

Fig. 22.

Fig. 21.—Case 2. Front view before and after treatment.
Fig. 22.—Case 2. Right lateral view before and after treatment.

2. No intermaxillary force was applied when the headgear and maxillary splint were used.

3. The maxillary protrusion was reduced without resorting to extraction.

There can be no question regarding this point, and it is certain that mass distal movement of the maxillary teeth was definitely brought about. The important thing is that this has never been accomplished before. This represents an entirely new approach which differs from all other attempts made in the

past. Even if this were done in one single solitary case, it would still be the most significant orthodontic news; and it gives me very great pleasure to report to you that I have more than seventy-five cases under treatment at my office in which mass distal movement of the maxillary teeth has been produced in varying degrees. Without exception they show improvement. We cannot

Fig. 23.

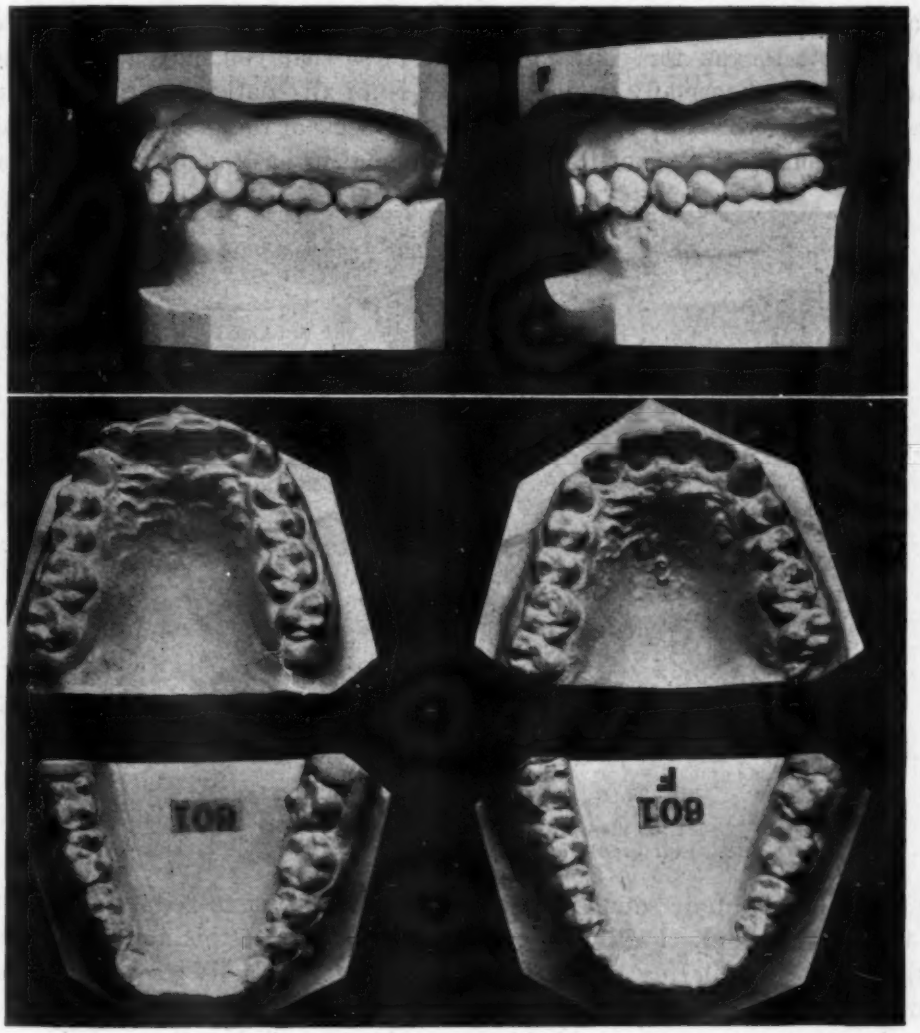

Fig. 24.

Fig. 23.—Case 2. Left lateral view before and after treatment.
Fig. 24.—Case 2. Occlusal view, before and after treatment.

foresee the possibilities of this appliance, but even at this early stage it has become indispensable in my practice. I could not get along without it. I am employing it under different conditions and I suspect that very much better results could be obtained in Class II cases by preparing the case for treatment. Using upper and lower bite retainers during the day and distal movement splint at night, the bite can be opened and normal arch relationship can be established

before other appliances are placed in the mouth. I have several cases under such preparation and I hope to give a report on the results within a very short time.

I may be criticized for bringing out this appliance too early without sufficient proof. This makes very little difference to me. I am fully convinced that more acceptable results could be obtained by the use of this appliance than by any other method known to the profession at this time. The fact is that I have reduced maxillary protrusions in several cases, and I am very anxious to present it to you for your consideration, so that you may also try this in your practice. Especially so, because this is an alternative treatment for those cases in which extraction is recommended. In view of the possibility of eliminating extraction by the use of this method, none of us has the moral right to order

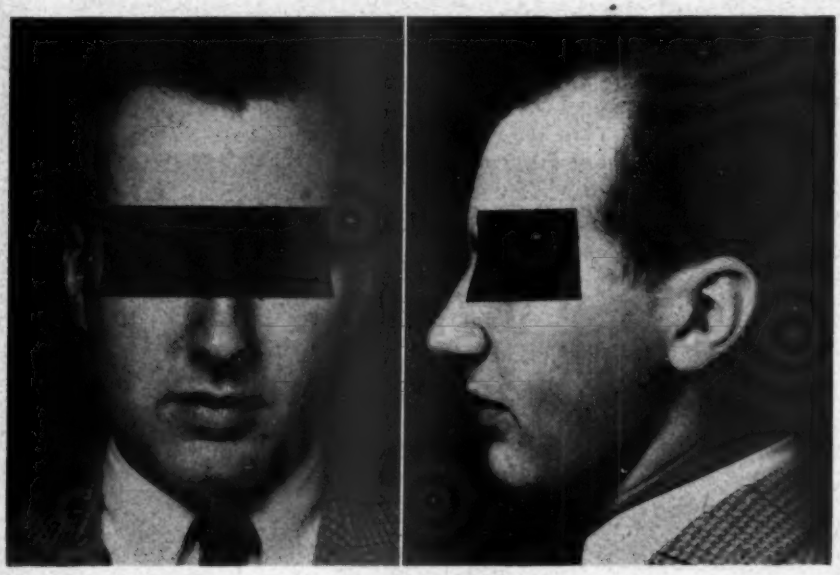

Fig. 25. Fig. 26.

Fig. 25.—Case 2. Front view after treatment.
Fig. 26.—Case 2. Left profile after treatment.

the extraction of four sound teeth without first trying to reduce to protrusion by this new method. Failing to give the advantages of this new method to our patients before ordering extractions may make us legally responsible for the mutilation thus produced. It is my belief that, under the present trends of practice, a new approach of this kind must be presented to the profession at the earliest possible moment. Six months' or a year's delay may mean the loss of thousands of good teeth, and the mutilation of very many mouths. I am willing to risk such criticism with the comforting knowledge that I have given you something today which will write a new chapter in the practice of orthodontics.

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THE EARLY REMOVAL OF UNERUPTED THIRD MOLARS

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DOUBTLESSLY, a great number of orthodontists and practitioners of general dentistry failed to insist on the early removal of unerupted third molars because they thought that such operations were associated with much trauma and mutilation, and were followed with considerable pain and swelling.

This is far from an accurate observation. The convalescence of such patients is always less eventful than that of those on whom more serious and difficult impactions are removed at a later time when the teeth are completely formed and the bone is denser.

The development of osteomyelitis and acute cellulitis never occurs, and only rarely does such a complication as a periostitis or so-called "dry socket" develop. Of course, some individuals have considerable swelling and edema following operative procedures, but this is always transitory, only remaining about five to seven days.

It is felt that more careful work can be done under local anesthesia upon these children. The safety factor enters into the picture and, as compared to general anesthesia, the element of time plays no part. However, the usual amount of time required to remove four of these unerupted third molars should seldom exceed forty or fifty minutes. There seems to be no contraindication for the removal of four at a time. All sites heal together and, of course, the returning for subsequent operations is eliminated.

The importance of premedication cannot be overstressed. The usual preoperative procedure followed is to instruct the patient to abstain from the meal just prior to the operation. The effect of the agent used as a sedative is more profound and immediate if it is taken on an empty stomach. Three grains nembutal or seconal together with one one hundred and fiftieth (1/150) grain atropine is the usual medication. Thirty minutes or so are allowed to elapse prior to starting the operation. Usually the sedation is so complete that it is necessary to help the patient to the operating chair. Quite often a bite block is employed so that the patient will keep his mouth open while the work is being done. In many instances the patient will develop complete amnesia concerning the operation, and only rarely is it necessary to supplement the original medication with an additional amount.

Under 2 per cent novocaine anesthesia, the technique as described by Dr. Sam H. Brock, Dallas, Texas, and as illustrated by Figs. 1 to 8, which were obtained from him, is employed.

Incision is made well back on the ascending ramus, coming forward to the distal surface of the second molar (Fig. 1). This is extended anteriorly as far as the mesial area of the first molar. Never at any time is a vertical incision made. The mucoperiosteum is reflected downward and posteriorly, ex-

posing the site of the unerupted tooth. It is imperative that an adequate flap be turned, which minimizes the trauma usually occurring when an effort to operate is attempted through too small an opening.

Fig. 1. Fig. 2.

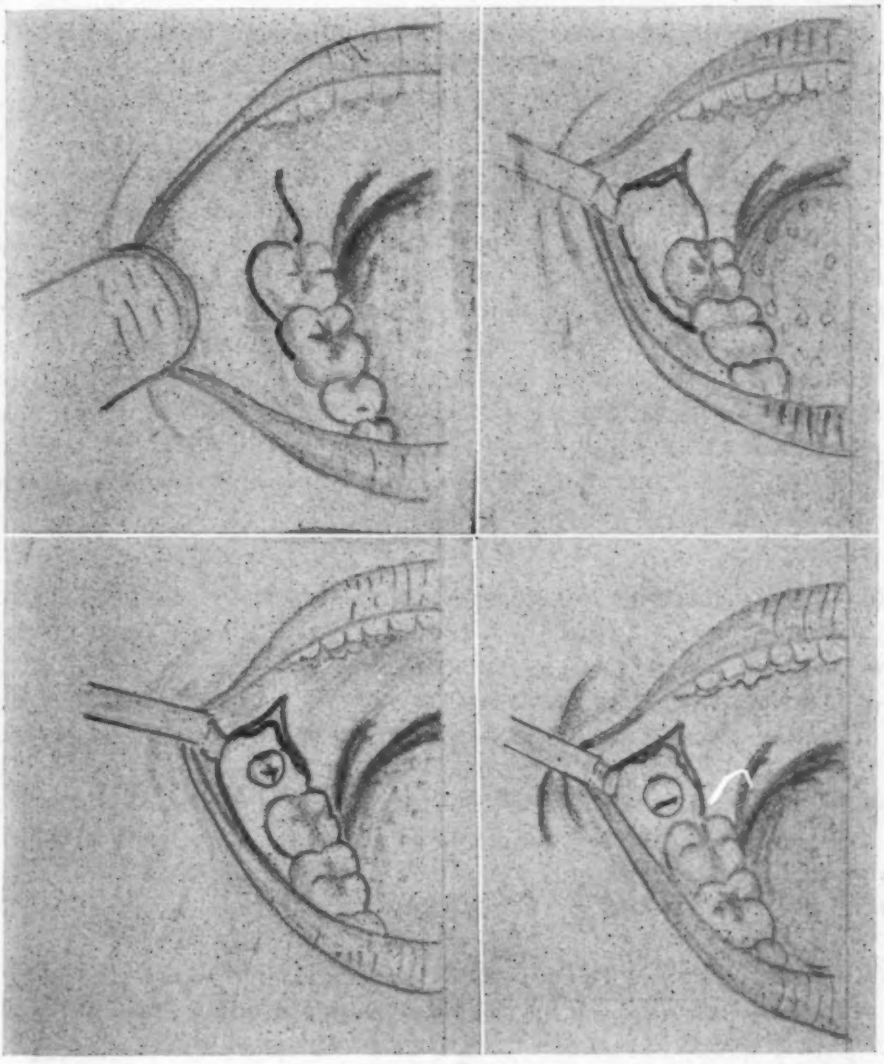


Fig. 3. Fig. 4.

Employing either a bi-bevel or tri-bevel drill under continuous water flow to prevent heat, several holes are made in the bone over the site of the tooth, as determined by radiographs. These holes are joined and the entire section of bone is removed with a straight elevator, exposing a part of the crown of the tooth (Figs. 2 and 3). A shelf or ledge of bone is allowed to remain between the distal of the second molar and the opening through to the tooth. This is most valuable, as it serves as an additional protection to the second molar.

In the employment of this technique it is necessary not to remove too much bone because, if this is done, the tooth, being incompletely formed, will roll

and turn on its bed of developmental tissue. This complicates its removal. The small opening furnishes a bony wall which aids in stabilizing the tooth and in preventing its movement.

Fig. 5.

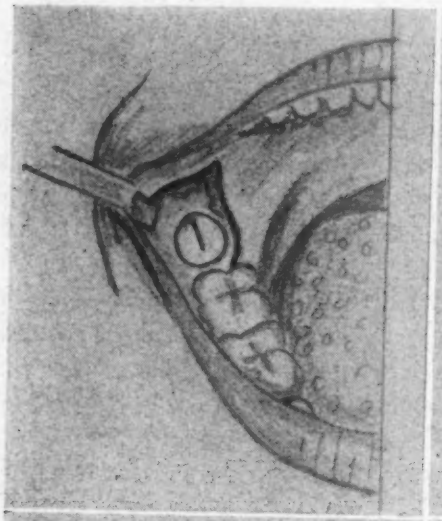
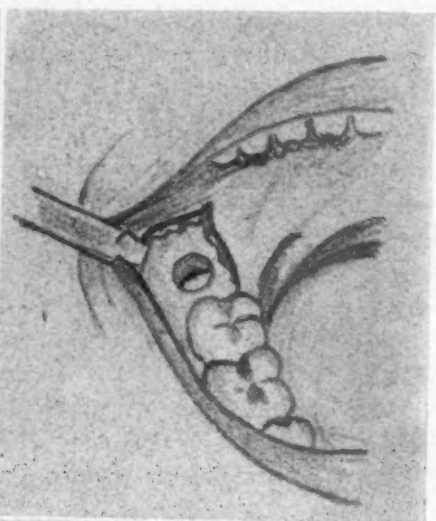


Fig. 6.



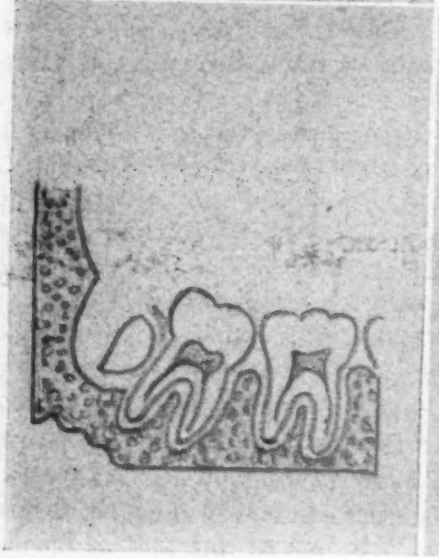


Fig. 7.

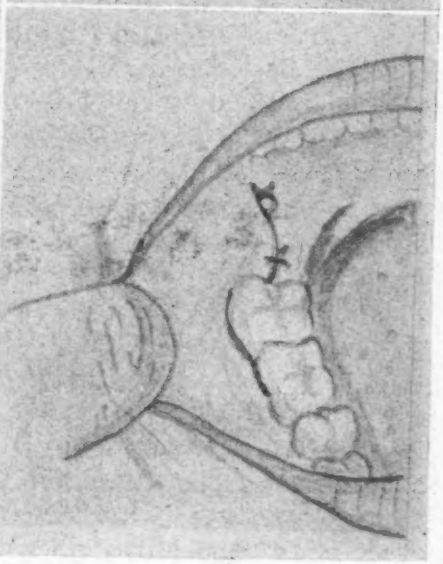


Fig. 8.

The crown is then sectioned, either mesiodistally or buccolingually, according to the direction that is the most advantageous (Figs. 4 and 5). The tooth is then removed in sections. The distal part is removed first and the space provided by the removal of this part is used to receive the remainder as it is elevated into it (Figs. 6 and 7). This provides for the major portion of the work being done on the tooth, thereby involving only a minimal amount of the bone. This, of course, limits postoperative reaction.

After the tooth has been completely removed, the remaining embryonal tissue is removed and the socket and flap areas are thoroughly policed and cleaned. The edges of the entrance to the socket are smoothed with a bone file and the mucoperiosteum is repositioned. Only one suture is required to hold the flap satisfactorily (Fig. 8). The employment of sulfa powder with about 5,000 Oxford units of penicillin in each socket area has apparently been of value. The convalescence of these patients has been uneventful, and recovery has been complete in a series of several hundred cases. These patients are always provided with a prescription containing codeine and aspirin, which keeps them comfortable immediately following the operation, so that no suffering is ever necessary during the operation or postoperatively.

The upper third molar does not offer the problem of removal that the mandibular unerupted molar does. Hence, very little time is spent in the discussion of its removal. The approach is complicated only by very small mouths. The same type of incision for the flap is made, never using any vertical incisions. If the tissue is in good position at the completion of the operation, it is not necessary to close the wound with a suture. Less edema and swelling follow than when the site is closed tightly with a suture. The bone structure is such that the removal of the tooth therefrom is usually quite simple.

SUMMARY

1. The technique employed simplifies a dental operation that is highly necessary in many mouths.

2. The development of irregularities of anterior teeth; the collapse of completed orthodontic cases together with serious impactions which would be most complicated to remove, if allowed to fully develop, is consequently prevented.

3. The second molar is spared damage through decay or operative injury by having the third molar removed before it has completely developed.

4. Encroachment upon the mandibular nerve by the aberrant tooth's causing numbness thereof upon removal is obviated by the early removal of these teeth.

5. Bone infections following this operation and acute cellular infections of the soft tissue are never an unpleasant sequelae following this procedure.

CONCLUSIONS

It is believed that the early removal of unerupted third molars offers a service that is safe, sane, and practical in every respect. It can be regarded as a definite oral and systemic health measure in the final analysis and, certainly, contributes to successful orthodontic treatment. The contraindications for this operation are apparently negligible.

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CONTRACTION COIL SPRING: ITS USES AND HOW TO MAKE IT

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THERE are many instances where a force which may be described as a "pulling action" is indicated during the course of orthodontic treatment. Such action would be required in closing spaces between teeth, as in the case of moving canines distally after extraction of the first premolars or in the case of diastema. In such cases, silk ligatures, steel ligatures, or elastics are often used. Some operators, to accomplish this action, depend upon a coil spring tied on each end by steel ligatures.

Silk ligatures are often applied to draw adjacent teeth together in order to close a space. Figure-eight loops are tied in cases of diastema involving maxillary incisors. In the use of silk ligatures we should be ever mindful of the uncertainty of a continuous contracting action. Many times these loops are found to be loose at subsequent appointments.

Steel ligatures are also used to draw teeth together; however, a nonyielding force is produced. The force from such ligature is too severe and sudden.

In cases where a pulling action is supplied by a coil spring tied on both ends by steel ligatures, the pull is more delicate and even. However, to tie the two steel ligature wires on each end of the coil spring is an exacting operation and the free ends of the tied parts tend to pierce or otherwise injure the tissues.

While confronted with these problems I conceived a method of simplifying the making of a contraction coil spring. This was first demonstrated by him at a meeting of the Pacific Coast Orthodontic Society in 1939 and for more than nine years it has been used with effective results.

These coil springs are made in two different types: the simple contraction spring (Fig. 1) and the double contraction spring (Fig. 2). The former is made up in three different lengths, short, medium, and long, to be used according to the width of the spaces involved. These assorted sizes are made up in quantity and kept in stock.

The double contraction spring is used, for instance, in cases where first premolars have been extracted and the anterior teeth are to be moved distally (Fig. 2). These must be made according to each individual case (Figs. 3 and 4).

Some of the uses of the simple contraction springs are illustrated in Figs. 5, 6, and 7. In the case of diastema of the maxillary central incisors, a reciprocal movement can be produced by tying the two central incisors with the simple coil spring, its ends wrapped once or twice around the labial wire distal to the open-tube attachments.

MAKING THE SIMPLE CONTRACTION SPRING

Materials: Broach holder; about 1 inch of 0.025 round wire; steel spring wires 0.006 inch or 0.008 inch; SSW No. 139 plier or any small-beaked plier.

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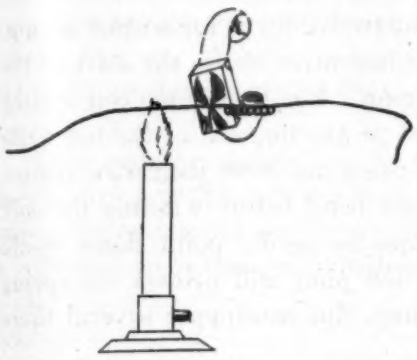

Fig. 1.

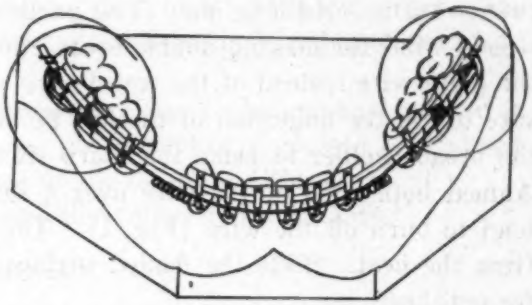

Fig. 2.

Fig. 2.—The double contraction spring brings the anterior teeth distally en masse. The incisal ribbon arch controls the bodily movement.

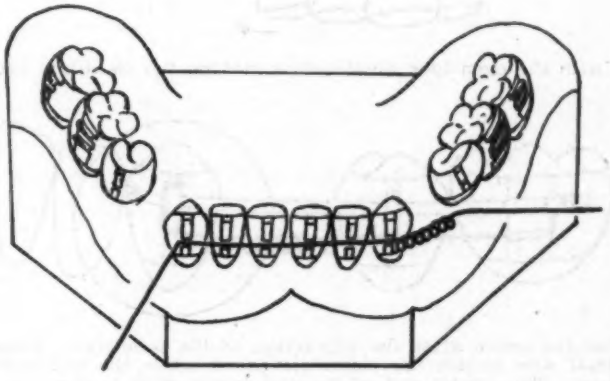

Fig. 3.

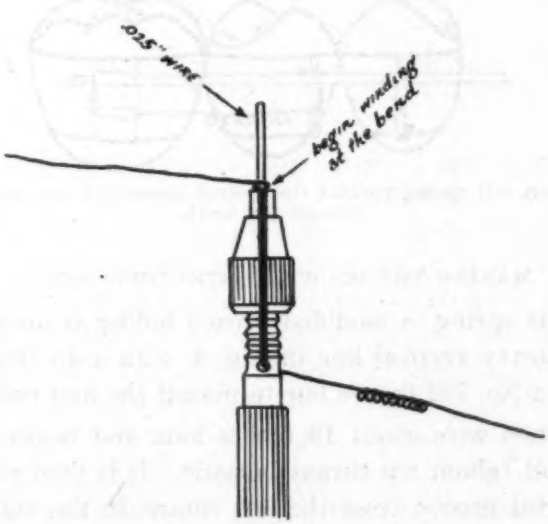

Fig. 4.

Insert the 0.008 inch wire (about 5 inches long) through one of the slits of the broach holder (Fig. 4) and wind a coil about twelve turns for a short spring, twenty turns for a long one. This particular illustration shows the start of the second wind for making double contraction spring. For the simple coil spring, the plain wire instead of the coiled wire will be protruding out of the hole. Be sure to use the fingernail of the left thumb to press the 0.008 inch wire against the broach holder to make the sharp right angle bend before winding the coil. Anneal both ends of the wire over a soft flame as needle point flame would tend to burn off the wire (Fig. 1). The No. 139 plier will protect the spring from the heat. Slide the flamed surface through fine sandpaper several times for polishing.

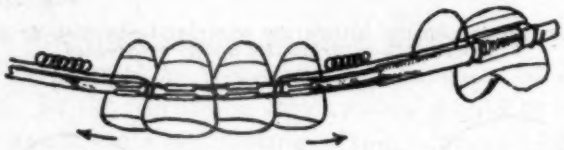

Fig. 5.—Used with the open-tube appliance in moving the maxillary laterals distally.

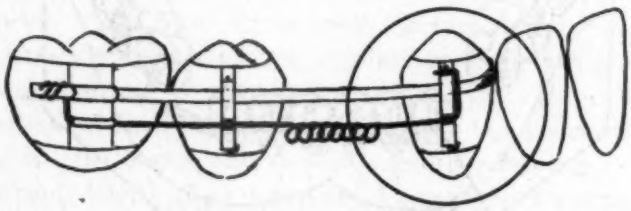

Fig. 6.—Closing the space after the extraction of the premolar. Distal movement of the canine; the flat incisal wire guides the distal movement while the contraction coil spring supplies the pulling force. The mesial end of the coil spring wire is bent on top of the flat wire and locked together with the lock pin. The mandibular first molars are stabilized by means of lingual arch wire.

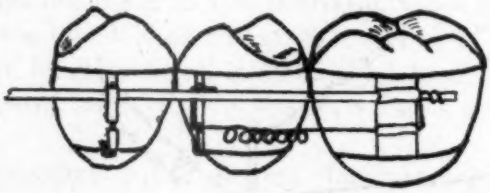

Fig. 7.—The contraction coil spring rotates the second premolar; the flat incisal wire does not engage the tooth.

MAKING THE DOUBLE CONTRACTION SPRING

In making this spring, a modified broach holder is made by cutting a slit, represented by a heavy vertical line in Fig. 4, with a Jo Dandy wheel. Then a hole is made with a No. 732 fissure bur to permit the first coil to pass through it.

Using 0.008 inch wire about 10 inches long and beginning about 2 inches from one end, a coil (about ten turns) is made. It is then placed and held carefully in the gingival groove from the left canine to the right canine (Fig. 3), and a little right angle bend is made at the distal of the attachment of the right canine. It is then removed from the mouth and the coiled end (first coil) of the

wire is placed through the hole in the broach holder until the bent angle of the wire just touches the junction of the 0.025 inch wire with the tip of the broach holder (Fig. 4). Another coil is wound from this point (about ten turns). The two ends are then annealed distal to each coil as shown in Fig. 1, and are ready for use.

Lock pins are placed in the six anteriors (Fig. 2) before any tension or pull is directed through the buccal molar attachments. Each end is wrapped once or twice around the distal extension of the flat wire (Fig. 2).

Other uses of these coil springs are well illustrated by Dr. Erikson.[1]

REFERENCE

Erikson, B. E.: Simultanous Distal Movement of Maxillary and Mandibular Buccal Segments, AM. J. ORTHODONTICS AND ORAL SURG. 28: 82-96, 1942.

Editorial

Dentistry's Most Romantic Story

MANY popular books and plays have glamourized the medical profession; however, unfortunately, the dental profession for the most part has had to be content with publicity not always so romantic.

Too often dental publicity has been accompanied by cartoons depicting various mechanical gadgets indirectly hinting that the patient as well as the dentist are part of a rapidly moving unlovely tableau. The real and serious advance made by dentistry in its short history has been left practically unheralded.

A book appeared not long ago for the first time, however, which was acclaimed by critics as top rank literature, in which dentists and dentistry take the spotlight. It was the book about the discovery and development of anesthesia, *Man Against Pain* by the well-known radiodontist and national figure in dentistry, Howard R. Raper, of Albuquerque, New Mexico.

This book recovers the story of the discovery of anesthesia and gives dentistry its rightful credit to its most dramatic tradition. The inspiration for this editorial arises from the fact that so few of the dental profession have read this book, and even fewer realize its significance to their profession.

The Saturday Review of Literature speaks of the book as the most exciting story for laymen about medicine, since Paul De Kruif wrote *Microbe Hunters* twenty years ago; it then goes on to say: "Dr. Raper writes like a dream ... with humor and love for his subject, with humility and with rare skill as a historian." Other reviews by the score were equally enthusiastic.

The book was accepted by the Scientific Book Club, twice dramatized on the radio, nominated for the Pulitzer Prize (history), put on phonograph records for the blind, condensed in half a dozen national magazines, including *Liberty* and *Pageant,* republished in London, and translated into Swedish, Dutch, Italian, and Spanish. Medicine saluted it as the "definitive" work on the subject, thereby dispelling the fear entertained by some dentists that physicians are unwilling to accept the facts no matter how clearly and honestly they may be presented. With commendable fairness, the *Journal of the American Medical Association* goes out of its way to support Dr. Raper in his effort to make a contribution toward settling the controversy by warning that "he should not be considered a partisan, but rather a conscientious student" of the subject.

You may ask why all this is so important to dentists, and the answer lies in the fact that we at last have in this book a means of clearing up the misunderstanding and dissension over the discovery of anesthesia and of regain-

ing the profession's lost tradition. Dentistry, by the way, is the only profession without a recognized, publicized, appreciated tradition. Medicine, law, and the ministry, all have their heroes who are identified with world-shaking events and who are recognized by everybody. Horace Wells and W. T. G. Morton, by discovering surgical anesthesia, brought into being what Sir William Osler spoke of as "the greatest single gift ever made to suffering humanity," and what Mark Twain described as something "more signally charged with beneficent consequences to mankind than any other event in the history of the world."

Attorneys display portraits of Lincoln on their walls; physicians point with pride to Osler and Beaumont; why, then, is it not commendable for dentists to point to Wells and Morton as well as to refer to Black and Taggert. Why not give Wells and Morton the credit they earned? Why not say of them—for it is true—that they delivered the human race from the agony of surgery? It will no longer be denied by any reasonable person who has read *Man Against Pain;* for here, at last, is the obviously true story and one which has now been accepted as authentic by both literary and medical critics.

A copy of the book should be placed on the reception room table as a matter of justifiable pride, and every dentist with a spark of pride *must* read it, as a part of his background of professional education.

Fate selected two dentists, Horace Wells and W. T. G. Morton, to discover anesthesia and introduce it into surgical practice. Dr. Raper has rescued the absorbing story of this magnificent accomplishment from the welter of bitter disagreement which has obscured it for so many years and has preserved it for posterity.

H. C. P.

Specialists

Benjamin Franklin is quoted as having said something about every man's ascertaining his special business or calling in life and then sticking to it, if he wants to be successful.

If Franklin had lived in the present day, he no doubt would have added that if one expects to qualify as a specialist in medicine or dentistry today, he must first prepare himself by long diligent study and hard work. The specialist is in the spotlight as never before.

Orthodontics and periodontology some years ago established specialist training programs and certifying boards, and now oral surgery obviously is to establish certifying boards on both a national and a state level. Oral surgery, no doubt, should have taken this step long ago inasmuch as its practice more closely coincides with hospital medical practice than does any of the other special departments of dentistry, and dental oral surgery has now far outlived and surpassed its "extraction" beginning. It must now be able to stand shoulder to shoulder with highly trained medical oral surgeons in hospital patient management.

More is expected and demanded of the specialist in dentistry than ever before and it is now being realized that the specialties are badly in need of some kind of regulation or possibly a yardstick of standardization.

In short, it is contended that if an individual becomes outstanding in some particular department of practice, it is not sufficient for him to announce formally that he is an expert; it should be a function of his own specialty to pass on him as well.

Accordingly, the committee of the Council on Dental Education of the A. D. A., which was at work on the problem before the war, has resumed its work and has now been authorized by the House of Delegates of the A. D. A. to formulate requirements for specialization.

The present committee consists of James R. Blayney, chairman, Bert L. Hooper, Frank J. Houghton, Carl O. Flagstad, and Harold J. Leonard. Their report, which was approved and adopted in its entirety by the Council on February 7, was prepared by Harlan H. Horner, Secretary.

In order to focus opinion on the subject, questionnaires were sent under the direction of Roy Elam (chairman) to members of national organizations of the various specialties. Seven questions were included, but of particular interest to all specialists is the following:

> Question 2. "What training and experience should a dental graduate have and what requirements should he meet before being publicly recognized as a specialist?"

The answer to this question has been much debated for many years. After a comprehensive poll and careful consideration, the Council has this to say on the subject, more or less as a summation of opinion.

"Candidates for certification as specialists should possess the following qualifications*:

"1. Satisfactory moral and ethical standing in the dental profession.
"2. Citizenship in the United States.
"3. Graduation from a dental school accredited or otherwise recognized by the Council on Dental Education.
"4. A license to practice dentistry issued by a legally constituted examining board, or by other legally constituted authority in the United States.
"5. Membership in the American Dental Association or the National Dental Association.
"6. A period of study after graduation from a dental school of not less than two years in graduate or post-graduate courses, hospitals, clinics, dispensaries or laboratories recognized by the Council and by the specialty examining boards as competent to provide adequate training in the special field. This period of study may be pursued wholly in a school giving graduate or post-graduate courses and may or may not lead to an advanced degree; it may also be pursued wholly in hospitals, clinics, dispensaries or laboratories, and it may be pursued partially in schools and partially in the other types of institutions. One full academic year of graduate or post-graduate study will be considered

*The Journal of the American Dental Association, Vol. 34, No. 8, April, 1947.

as equivalent to a calendar year. Teaching in the field of the specialty may be considered in partial fulfillment of this requirement. The character of this period of study will be determined by the specialty examining board, subject to approval of the Council.

"7. An additional period of not less than three years of practice devoted primarily and principally to the specialty, which may be combined with further study under conditions determined by the board, subject to approval by the Council.

"8. A satisfactory standing in the examination prescribed by the specialty examining board."

Through the inspiration of the late Dr. A. H. Ketcham of Denver, Colorado, orthodontists pioneered the certification idea, which followed the pattern of the then existing Medical Specialty Boards.

The Orthodontic Board like the medical boards started by certifying men regarded by the board as competent despite lack of formal training; however, that idea has passed.

If present plans and the outline of the oral surgery group are any criterion of what they actually expect to bring about in the not too distant future, this group will far outdistance the orthodontists in creating rigid requirements for certification of specialists in oral surgery. If that happens, when a dental oral surgeon announces that he will now limit his practice to oral surgery and that he has been certified, then his colleagues may rest assured that he is properly qualified and trained for his life's work.

Much will be heard during the months to follow about specialists in dentistry and about certification, qualification, and the right to declare as an expert in any particular department of dentistry. The question will be brought up for official consideration before the House of Delegates of the American Dental Association in Boston in August.

H. C. P.

Department of Orthodontic Abstracts and Reviews

Edited by

DR. J. A. SALZMANN, NEW YORK CITY

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Essentials of Surgery for Dental Students: By J. Cosbie Ross, M.B.(Hons.), Ch.M. (Liverpool), F.R.C.S.(England), Lecturer in clinical surgery to dental students, University of Liverpool; Honorary Surgeon to outpatients, Royal Infirmary Branch of the Royal Liverpool United Hospital; Visiting Surgeon and Urologist to Smithdown Road City Hospital; Hunterian Professor, Royal College of Surgeons; Surgeon, E.M.S. Late Surgeon, Rainhall Emergency Hospital; and late Honorary Assistant Surgeon, Birkenhead General Hospital. A William Wood Book. Baltimore, Williams & Wilkins Company, 1945.

This book is intended expressly for the dental student who is about to take up hospital residential dental service. The clinical approach is expressed throughout. Emphasis is placed on basic surgical principles and considerations of special interest to the dentist. In addition to the purely dental condition described, information is included also on the management of diseases of organs contiguous to the dental field. The part on the examination of the oral cavity includes lesions of the lips, facial clefts, the tongue, the buccal cavity, and the salivary glands. Photographs of pathologic conditions as seen in patients, are shown in black and white and in color. In each case the method of treatment is explained. The treatment of jaw fractures and deformities, and wounds of face, jaw, and neck in general have been included. It is rightfully pointed out that while these conditions present themselves with greater frequency in wartime, they are in nowise different than the effects of traumatic injuries involving the face and jaws as found in civilian life. This is an intensely practical volume which will be found of constant practical use by the general practitioner of dentistry as well as the hospital dental surgeon and internist.

The Complete Pediatrician Practical, Diagnostic, and Preventive Pediatrics: By Wilbust C. Davison, M.A., D.Sc., M.D., Professor of Pediatrics, Duke University School of Medicine, and Pediatrician, Duke Hospital; formerly Acting Head of Department of Pediatrics, The Johns Hopkins University School of Medicine; Acting Pediatrician in Charge, The Johns Hopkins Hospitals; Member, American Board of Pediatrics; Fellow American Academy of Pediatricians and American College of Physicians; Member, American Pediatric Society and Division of Medical Sciences, National Research Council. Fifth edition. For the use of medical students, interns, general practitioners, and pediatricians. Durham, N. C., Seeman Printing and Duke University Press, 1946.

This book is now in its fifth edition. As was formerly the case, special emphasis is placed on symptoms and signs as a clue rather than on description.

The purpose of this book is to enable the pediatrician to differentiate between normal and abnormal growth and to recognize diseases in children and what to do for them. In the present edition, additional information is presented on chemotherapy. The attempt has been made to combine in one book valuable information usually found in several volumes. The book is replete with cross references. This is not only space-saving but tends to present every phase of diseases in children and their gramifications.

Material is presented on abnormalities of the dentition, the mouth, and the tongue. One wonders where the author got his information on orthodontics, concerning which he states "If a child's second teeth are very crooked, and malocclusion is present, they must be straightened before 14 years." It is to be regretted that medical authors in general and Professor Davison, in this instance, did not take the trouble to consult recent orthodontic publications on this subject. It is generally well known that certain cases of malocclusion should be treated in the deciduous dentition. On the other hand, orthodontics is being successfully performed for patients older than 14 years of age.

Information is provided on the care and feeding of infants with harelip and cleft palate. Of especial interest to orthodontists will be the sections dealing with growth and the various diseases that procedure changes in the growth of the head, face, and jaws. A table on Weight-Height-Head-Chest-Average measurements of normal children is presented. As is to be expected in a book of this type, a complete index is presented.

Acrylics and Other Synthetic Resins Used in Dentistry: By Stanley D. Tylman, M.S., D.D.S., Professor of Prosthetics and Head of Crown and Bridge Department, University of Illinois, College of Dentistry, Chicago, Illinois, and Floyd A. Peyton, Ph.D., Assistant Professor of Dentistry, Department of Metallurgy, University of Texas, School of Dentistry, Houston, Texas. Philadelphia, J. B. Lippincott Company, 1946.

With the coming of the so-called plastic age, dentistry has taken full advantage of the benefits of this new material. After some more or less unsuccessful attempts in the use of synthetic resins in dentistry, the introduction of acrylic resins has brought the use of plastics for denture bases, as well as for crown and bridge restorations and fillings, to a firm foundation.

This volume is written by two well-qualified men in the field. The subject matter is written in two sections. Part I provides an analysis of the chemical and physical nature of resins including plasticizers, catalysts, pigments, and opacifiers. The processing of dental resins is fully discussed. Part II covers the clinical application of synthetic resins and presents the techniques for their use. The book is fully illustrated. In addition to dentures, procedure for making acrylic inlays and crowns is presented. A chapter is also included on fixed bridgework involving the use of acrylics. Various types of acrylic dentures are discussed, including the construction of orthodontic retainers. The construction of artificial ears, eyes, and other somatoprosthetic appliances is given due consideration and is fully illustrated. Techniques of restoration are clearly described throughout. This book should serve as a practical guide for the dentist in using acrylics in his practice.

Much of the information here presented has been gathered from many sources. The effect has been made to bring together most of the studies in this field in order to save time and labor for the busy dentist.

Annual Review of Physiology: By James Murray Luck, Editor, Stanford University; Victor E. Hall, Associate Editor, Stanford University. Volume VIII. Published by the American Physiological Society and Annual Reviews, Inc., 1946. On sale by Annual Reviews, Inc., Stanford University P. O., California.

The Annual Review of Physiology was initiated in 1939, and since that time the publication has become a standard work of reference on the contributions to this field. While many foreign periodicals are still unavailable and many of the interests of physiologists were on wartime ban during the preparation of this volume, there are, nevertheless, a number of new contributions which should prove of interest; some of them will be found of special interest to the dentist and orthodontist.

Authors of the various articles have included their own interpretation of publication data and, on occasion, have even departed from the conclusions of others. In accounts presented in papers by Lasker in which evidence is given of the wide range of plasticity of the human skeleton, including the teeth, dental caries is shown to be subject to environmental influences. No racial trend could be detected in the teeth although the shape of the upper incisors is so strongly genetic as to show distinctive differences in the various regions of a country. The section on developmental physiology discusses the correlation of form and function.

Important contributions are presented on congenital malformations in which dietary deficiencies of the mother are shown to be responsible for congenital malformations. The pH of saliva was found to have relationship to seasonal fluctuations and even to hourly fluctuation. A new method was presented for determining the amylatic activity of saliva. Considerable difference in pH was found although there was no correlation between these pH readings and the amount of caries. However, the diastatic index of saliva was found to be universally related to the amount of caries. No lactobacilli were found in stool specimens from children whose teeth were free from caries. During this period the presence of lactobacilli was only occasionally recorded in the saliva of these subjects. This is a valuable book and it contains much of interest to students and practitioners of dentistry. Author and subject indexes are provided.

Applied Anatomy of the Head and Neck for Students and Practitioners of Dentistry: By Harry H. Shapiro, D.M.D., Assistant Professor of Anatomy, College of Physicians and Surgeons, Columbia University. Second edition, revised and reset with 221 illustrations including 41 in color. Philadelphia, J. B. Lippincott Company, 1947.

Shapiro has effected changes in the present edition so that it is practically a new book. While the original purpose of the book—to correlate anatomic instruction with clinical application—has been preserved, the material presented in the second edition has been thoroughly revised and many new chapters have been added. Among the new material are chapters on development of the head and neck, the paranasal sinuses, the anatomy of oral infections and of the edentulous mouth. In each instance the clinical application is presented. Additional material is presented on interpretation of the anatomic landmarks as seen in roentgenograms of the skull. Included also is the roentgenographic interpretation of tooth development, the temporomandibular joint, the sinuses, and other structures. Anatomic considerations of jaw fractures and the control of hemorrhage and infection are duly explained.

The quality, number, and character of the illustrations deserve unqualified praise. This book is one of the best to come to the notice of this reviewer in recent years. The author and the publisher are to be congratulated on an excellent volume. Students, general practitioners of dentistry, oral surgeons, and orthodontists will be well rewarded by reading this book.

The Genesis of Dental Education in the United States: By Broadus Dalton, D.D.S., member, The American Society of Oral Surgeons, associate member of the Academy of Medicine of Cincinnati, Ohio, author of *Essentials of Orthodontia,* Columbus, Ohio, Spahr and Glenn Company, 1946.

The origin of dental education in the United States is usually accepted to have taken place in Baltimore. In this volume, Dr. Dalton brings out the fact that formal dental education in the United States and in the world was brought to birth and cradled in the little village of Bainbridge, Ohio, in the Fall of 1827 by Dr. John Harris, an older brother of Chapin A. Harris. In this volume, the authenticity and importance of the contributions of John Harris to American dentistry are established on a firm foundation.

An account is presented of the career of Chapin A. Harris and his activity in the founding of the first dental school. Dr. Dalton considers the years 1825 to 1845 the greatest twenty years in dental history. It was during this time that anesthesia was introduced. The College of Oral Surgery in Baltimore was founded and great progress was made in the mechanics of dentistry.

It is seldom that one hears the Society of Surgeons of Dentistry of the city and state of New York, founded in 1834, referred to as the first dental society in the world. It is to be regretted that the annals of dentistry in New York City have not yet found a proper historian. Those who feel that dental society postgraduate activities are of recent origin would be interested in knowing that the objects of the New York Society in 1834, as set forth in its constitution, include the advancement of "The Science by free communication and interchange of sentiments either written or verbal between members of the Society both in this and other countries." Dentists may well feel proud of the great men whose names live in the history of their profession. American dentists should realize that the efforts of the men who lived in the mid nineteenth century have made it possible for the profession to have achieved its present leadership. Interesting accounts are presented on the so-called amalgammor. As early as 1853, the American Society of Dental Surgeons forbade not only process patents but the patenting of instruments and nostrums.

This book lays great stress on the contributions of the Ohio dentists, in particular, in the building of the dental profession from its educational and organizational standpoints. An interesting account is presented also on the organization of the American Society of Orthodontists by Edward H. Angle. A chronology of dental periodical literature is presented. This volume is a source book on the genesis of dental education and organization in the United States, expecially in the state of Ohio.

News and Notes

Southern Society of Orthodontists

Monday Morning, April 21, 1947

The Southern Society of Orthodontists held its twenty-third annual meeting at the Battle House in Mobile, Alabama. The meeting was called to order by the President, Dr. J. E. Brown, Jr., of Mobile, Alabama. The invocation was given by Rev. A. Carl Adkins, Pastor of the Dolphin Methodist Church. The address of welcome was given by Commissioner Charles Baumhauer of Mobile, Alabama, and the response to the welcome address was given by Dr. Walter T. McFall of Asheville, North Carolina. The visitors were introduced. The minutes of the preceding meeting were read and the report of the Secretary-Treasurer was given by Dr. Leland T. Daniel of Orlando, Florida. Committee reports were given, followed by the President's address by Dr. James E. Brown, Jr. This address was very interesting to all of the members. It was given careful study and consideration and some very fine points were brought out.

At eleven o'clock, Dr. George R. Moore, of Ann Arbor, Michigan, gave an interesting paper on diagnosis.

Monday Afternoon, April 21, 1947

At two o'clock, a paper, "Tooth and Bone," was given by Dr. Harry Sicher, M.D., of Chicago, Illinois. In presenting the subject, the following topics were discussed:

1. Is the development of the jaws dependent on the presence of teeth?
2. Does the growth of the jaws influence eruption and position of teeth?
   a. Growth of the mandible as a leading factor in facial development
   b. Growth of maxilla
   c. Disharmonies of facial growth
   d. Mechanism of tooth eruption
   e. Mesial drift
   f. Pathologic and adaptive tooth migration
   g. Healing of the socket after tooth extraction

This was an excellent paper and the men received a great deal of benefit from it.

At four o'clock, Dr. Andrew Francis Jackson, Philadelphia, gave some case reports. This was a very interesting presentation.

The annual banquet was given at 7:00 P.M. It was informal and everyone enjoyed the fine dinner and the excellent orchestra. During the banquet, Dr. A. C. Broussard of New Orleans presented "Uncle Jake" Gorman with an onyx pen set. Jake was the first orthodontist in the South and we felt it very fitting that this little token of our esteem be presented to "the Daddy of Orthodontics in the South." He graduated from the Angle School and has been practicing in the South ever since.

Tuesday Morning, April 22, 1947

At nine o'clock a business session was held. This consisted of the report of the Board of Directors, report on the President's address, committee reports, unfinished business, new business, and election of officers. Dr. Neil J. Leonard of Memphis, Tennessee, President-Elect, was advanced to the office of President. Dr. S. D. Gore of New Orleans was elected President-Elect, Dr. Orville Van Deusen of Winchester, Virginia, Vice-President, and Dr. Leland T. Daniel of Orlando, Florida, was re-elected Secretary-Treasurer.

The committees for the coming year are composed of the following:

Board of Directors: Dr. E. C. Lunsford, Chairman, Miami, Florida; Dr. W. H. Lewis, Petersburg, Virginia; and Dr. Walter T. McFall, Asheville, North Carolina.

Education Committee: Dr. W. B. Childs, Chairman, Macon, Georgia; Dr. J. A. Gorman, New Orleans; and Dr. Olin W. Owen, Charlotte, North Carolina.

Research Committee: Dr. Boyd W. Tarpley, Chairman, Birmingham, Alabama; Dr. Glenn Phillips, Jacksonville, Florida; and Dr. William D. Curtis, Washington, D. C.

Public Relations Committee: Dr. Frank P. Bowyer, Chairman, Knoxville, Tennessee; Dr. H. T. Gosney, Danville, Virginia; and Dr. Harry Keel, Winston-Salem, North Carolina.

Delegate to the American Association of Orthodontists, Dr. A. C. Broussard, New Orleans, Louisiana; alternate, Dr. Fred Hale, Raleigh, North Carolina.

Dr. A. Leroy Johnson, Boston, Massachusetts, Dr. Claude R. Wood, St. Louis, Missouri, and Dr. Leumwan M. Waugh, New York City, were elected honorary members of the Society.

Following the business session, Dr. George R. Moore, of Ann Arbor, Michigan, continued his discussion on diagnosis. At eleven o'clock Dr. A. P. Westfall, of Houston, Texas, gave a paper on "Facial Aesthetics in Relation to Orthodontics."

Tuesday Afternoon, April 22, 1947

The following group clinics were presented: "Demonstration of the Treatment of a Case of Bimaxillary Protrusion," by Dr. A. P. Westfall; "Labiolingual Technique With Occlusal Guide Plane," by Dr. Frank P. Bowyer, Knoxville, Tennessee and Dr. Boyd W. Tarpley, Birmingham, Alabama; and "Caries Control Diagnostic Service" by Dr. George H. Hauser, Dr. Paul Cook, and Miss Lucile Godelfer of New Orleans, Louisiana. At the close of the clinics a business session was held and the officers were installed.

The ladies' entertainment was very much enjoyed. On Saturday evening, April 19, a buffet dinner was given by Dr. J. E. Brown, President of the Society, and Mrs. Brown at their home. Sunday evening a buffet dinner was given by Dr. and Mrs. Brown at the Battle House. On Monday morning the ladies, sixty-three in number, had a trip to the Bellingrath Gardens folllowed by a luncheon at the Country Club.

The officers and committees are to be congratulated on the splendid meeting. Sixty-eight members of the Southern Society and forty guests were present. We are looking forward to the meeting in Memphis in 1948.

Great Lakes Society of Orthodontists

The eighteenth annual meeting of the Great Lakes Society of Orthodontists will be held October 27 and 28, 1947, at the Royal York Hotel, Toronto, Canada.

The two-day meeting will feature the following essayists:

Dr. Wendell Wylie, San Francisco, California.

Dr. W. B. Downs, Chicago, Illinois.

Dr. Andrew Jackson, Philadelphia, Pennsylvania.

Northeastern Society of Orthodontists

The next meeting of the Northeastern Society of Orthodontists (formerly New York Society of Orthodontists) will be held at the Waldorf-Astoria Hotel, New York, on Monday and Tuesday, Nov. 10 and 11, 1947.

Annual Seminar for the Study and Practice of Dental Medicine

The West Coast's Fourth Annual Seminar for the Study and Practice of Dental Medicine will be held at the Ahwahnee Hotel, Yosemite Valley, California, Oct. 19 to 24, 1947, according to an announcement by Dr. Hermann Becks, President of the Board of Directors and Professor of Dental Medicine at the University of California.

American Dental Association—Annual Meeting

Hotel reservations for the eighty-eighth annual meeting of the American Dental Association at Boston, Aug. 4 to 8, 1947, should be made immediately with the A.D.A. Housing Bureau at Boston.

American Dental Directory

A new directory of all dentists in the United States will soon be published by the American Dental Association.

Under the direction of John J. Hollister, A.D.A. business manager, a special staff has been engaged for more than a year in gathering and cataloguing data on dentists throughout the nation.

Entitled "American Dental Directory," the new publication will contain an alphabetical listing plus a geographic listing (by states and communities) of more than 70,000 dentists in the United States. Only those names which could not be confirmed or traced were excluded from the directory.

Following the name of each dentist in the geographic listing will be code symbols showing: whether he is a member of the American Dental Association; the character of his practice; the dental school from which he was graduated; and the year of graduation. The street address, city, and state will also be listed for each name.

The new directory will be the first of its kind ever to be published by the American Dental Association. Previously, dental rosters published by the Association were limited to the names and addresses of A.D.A. members in good standing. The new publication will list nonmember as well as all member dentists.

In addition to the alphabetical and geographic lists, the new American Dental Directory will contain considerable reference material.

Included will be a brief history of the American Dental Association, a map outlining A.D.A. trustee districts, the dental code of ethics, a list of dental schools, a directory of former A.D.A. annual meetings, listing cities and total attendance, an organization chart of the A. D. A., and many other features.

The book will be 8½ by 11 inches in size and will contain approximately 1,000 pages. It will be published in August.

Through the alphabetical and geographic lists, it will be possible at a glance to locate any dentist in the United States either by name or address, and in nearly all cases to check on his affiliation with organized dentistry, whether he is engaged in general or specialized practice, the name of the dental school he attended, and the date of his graduation.

The directory will be of particular value for referring patients to dentists in other cities and for locating colleagues. It will also provide a quick reference to a variety of important dental information.

Individual dentists, and component, district and state society officers, as well as schools, libraries, and business firms will find the American Dental Directory a valuable addition to their reference sections.

The directory will be sold at a reduced price of $10.00, postpaid from the Central office of the American Dental Association, 222 East Superior Street, Chicago 11, Illinois, if ordered in advance of the midsummer publication date. A check or money order for $10.00 must accompany advance orders to obtain the special prepublication price. After publication date, the price will be $12.50 a copy.

Bond-a-Month Plan

Full endorsement of the Bond-A-Month Plan of the United States Treasury Department has been made by Dr. Sterling V. Mead, of Washington, D. C., president of the American Dental Association.

Dr. Mead urged that all dentists use the plan as a means of personal investment and a contribution in the war against inflation.

"During the war, the dental profession contributed greatly," he said. "Nearly one-third of all the dentists in the nation served in the armed forces, restoring and maintaining dental health for millions of servicemen and women.

"Today, dentists as well as other professional persons will find the Bond-a-Month Plan an easy way to invest in their own future and their country's future.

Through the Bond-a-Month Plan anyone who has a personal checking account at a bank can now buy United States Savings Bonds regularly and automatically.

Only one transaction is involved. You tell your banker that you want to buy a bond of a certain size at monthly or other convenient intervals. Sign the order the banker will give you.

From then on, your bank will buy the bond regularly, send it to you, and debit your account for the purchase price.

Bonds increase in value 33⅓ per cent in ten years.

In urging full participation in the plan by the nation's 75,000 dentists, Dr. Mead said:

"There is no investment like U. S. Savings Bonds. They are as safe as the nation itself. Each three dollars invested will be worth four dollars in ten years. Any time you need cash, the bonds can be turned in without loss. The Bond-a-Month Plan is the best way to save, and you will hardly miss the money."

Public Information

Programs in the extension of dental health service to more people depend greatly on public information activities, particularly at the local level. An informed public is the greatest ally the profession can have in its campaigns to establish practical dental health programs in each community.

In each state, there should be a carefully planned program of public information. All information media—the press, radio, lecture platforms, pamphlets, and health exhibits—should be used to enlist public support of dentistry objectives. Whenever possible, such programs should be directed by a full-time executive secretary or a public relations consultant or adviser. Close supervision should be maintained by state officers and authorized committees of the state societies. Several states now have excellent public relations programs in operation. These provide an excellent pattern of study for officers of state societies who do not now have an active operating division of public information. In all cases such programs should supplement the national program being carried on by the Bureau of Public Information of the American Dental Association.

Insofar as possible, state public information programs should attempt to enlist all dentists in a continuing campaign to disseminate correct information regarding dentistry to the public. Each dentist should be kept fully informed regarding professional activities dealing with the public. Each state should establish a speakers' bureau. Talks on dentistry should be encouraged at various public functions, particularly meetings of service clubs, Parent-Teachers Association, civic organizations, and other groups. Summaries of these talks plus announcements of activities of state and local societies should be provided local newspapers and other publications.

Another important phase of any state-wide information program is the use of the radio. All radio stations devote a portion of their time to public service. With the proper type of programs dentistry will find most stations ready and eager to cooperate. It is important, however, that dental programs be well planned in advance and not set up on the spur of the moment. It is quite possible that a program such as "Your Dentist Speaks" could be established in each community on a weekly basis. The Bureau of Public Information of the American Dental Association has available a number of scripts and transcriptions which can be used successfully. These can be secured at the Central Office in Chicago. Others can be devised locally to meet local problems or cover items of interest.

There is an almost inexhaustible list of subjects for local radio programs. A partial list follows:

"Why Your Boy Should Study Dentistry," "Dental Education in America," "Early Problems of the Profession," "Notable Characters in the Dental Profession," "Notable Contributions by Dentists," "Dentistry's Role in the Elimination of Pain," "Research Activities of the American Dental Association and State Dental Associations," "Our Programs for Extension of Dental Care," "Our Goal of Research," "Cooperation Between Dentist and Physician in the Interest of the Patient," "Diseases Which Arise in the Mouth," "Focal Infection," "Manifestation of Diseases of the Body in the Mouth and the Importance of Early Recognition," "Caries," "Periodontal Disease and Methods of Treatment," "Vincent's Infection," "Abscess," "Hearing," "Children's Dentistry—Information Courses for Care of Children, Psychological Approach to the Child, Early Care of Teeth, School Programs, Cooperation of Parents," "The First Dentition," "The Eruption of the Teeth," "Methods of Brushing the Teeth," "Habits of the Child, Such as Thumb Sucking," "Dental Information Courses, Especially for Children," "Why Fill or Save Deciduous Teeth," "Orthodontia—Preventive and Corrective," "Speech Correction," "Why Fill Children's Teeth," "Use of Toothpastes," "Use of Mouthwashes," "Care of the Mouth," "Economics," "What Do You Pay For?" "The Patient's Responsibility," "Vitamin Deficiencies," "Fractures," "Growths and Tumors," "Deformities," "Esthetics," "Acrylic Eyes," "Plastic Replacements," "Why Replacements?" "Dentistry in the Services," "Veterans' Programs," "What Do X-rays Show?" "What Is the Purpose of Transillumination?" "Pain—Various Kinds and Significance."

In public relations activities dental societies should maintain close cooperation with medical societies. What happens to medicine should be of great concern to dentistry as it will surely happen to dentistry in turn. The two professions have common objectives. Particularly in the matter of national or state legislation should the professions work in harmony. Legislation is almost entirely dependent on public opinion and the public's interests. It should be on the basis of the people's best interest that dentistry take action in support of or opposition to any legislation affecting public health.

Sterling V. Mead

Puerto Rico

Your president was a guest of the Annual Assembly of the College of Dentists of Puerto Rico, Jan. 22 to 28, 1947.

The experience will long be remembered because of its social and educational opportunities. You would be proud of the organization and the work of the dentists of Puerto Rico.

The problems of these dentists are very similar to the problems in the various states here. The great need is for the extension of dental services to more people. Puerto Rico as a territory should be included in any grants-in-aid bill for dentistry.

The dentists of Puerto Rico are organized as a constituent of The American Dental Association. Because of their location, history, customs, language, and education in the United States, they are in an enviable position for support of a program of complete understanding between North and South America.

When Puerto Rico was a possession of Spain, the dental profession there followed the same tactics as in Spain. Therefore, before the year 1875, there was no regulation to the practice of dentistry. In 1875, the Spanish government published a decree prohibiting from practice all those who did not have a university title. On October 18, 1898, when the Island was turned over to the United States, the dental profession in Puerto Rico was operating under the antiquated Spanish regulations. It was at this time, when the American Military Department took charge of the government, that an Army doctor was ordered to examine the licenses then in force. It was found that some persons, although not graduates from dental schools, were allowed to practice dental surgery by tolerance. The American Military Department extended licenses to these persons so that they could continue practice under

the new government. In the year 1900, when the Civil Government was established in the Island, a Board of Dental Examiners was created by legislation. From that date on, every person who wished to practice dental surgery in Puerto Rico had to present a diploma from a school or college and pass an examination in order to obtain a license.

In 1907, the first dental society was founded. Four years later, in 1911, it was incorporated as a unit of the former National Dental Association. This dental society of Puerto Rico was named "Asociacion Dental de Puerto Rico" and continued as such until 1942, when by a legislative disposition, it was created the "Colegio de Cirujanos Dentistas de Puerto Rico," the only official institution of the dental class.

The Colegio de Cirujanos Dentistas de Puerto Rico is an institution created by law and it is necessary that every dentist belong to this society in order to practice. This law has enabled the dental association to obtain a one hundred per cent membership. The law also gives the dental class the right and power to make the necessary rulings to conduct the society. These rules are compulsory for each and every dentist in practice in Puerto Rico.

The dental board is composed of three dentists appointed by the Governor of the Island but the dental institutions have the privilege to recommend the candidates for those positions. According to the law, strictly speaking, the Governor must select from the list of candidates recommended by the dental societies. All candidates to practice dentistry in Puerto Rico must be graduates of accredited dental schools. With the exception of one or two dentists, all of them are graduates of American dental universities.

Sterling V. Mead

Salient Points in Report of Atomic Bomb Casualty Commission

A number of interesting facts relating to the Japanese who survived at Hiroshima and Nagasaki were disclosed in the report of the Atomic Bomb Casualty Commission released by the War Department at a recent press conference held in the office of the Surgeon General.

Brigadier General Raymond W. Bliss, Deputy Surgeon General, and Colonel W. S. Stone, Chairman, Army Medical Research and Development Board, presided at the conference. Dr. Austin M. Brues and Dr. Paul S. Henshaw, who directed the Commission's survey, as well as other atomic scientists, were present.

The report carries no spectacular data or stories on freakism or physical anomalies among babies born to persons who were exposed to the bomb. It does not deal in the sensational. Based upon a study which was relatively short (about six weeks), the report simply gives a direct, unpretentious picture of work which is under way to evaluate the results upon human beings of a massive dosage of radiation, in combination with the heat and concussion generated by nuclear fission.

The commission, whose task is completed with presentation of the report, was composed of two civilian physicians, two Army medical officers, and one Navy medical officer. They are Dr. Austin M. Brues and Dr. Paul S. Henshaw, Lieut. Melvin A. Block and Lieut. James V. Neel (MC) U. S. Army, and Lieut. (j.g.) Frederick W. Ullrich (MC) USNR. Dr. Brues, who is an outstanding authority on biology of radioactive material, is the Associate Professor of Medicine at the University of Chicago and Director of Biology Division, Argonne National Laboratory, Chicago, Illinois.

Dr. Henshaw, who is a noted authority in radiobiology, is now with the Clinton Laboratories, Oak Ridge, Tennessee.

Lieutenant Ullrich is doing research in radiobiology at the Naval Medical Research Institute at Bethesda, Maryland.

Captain Block, medical officer, United States Army, has been associated with the study of radiation plan from the onset and Lieutenant Neel, a medical authority in the field of genetics and biometry, has been recently added to the project. They are at present in Japan as the remaining members of the team.

Their investigation, launched in Japan late in November of last year and concluded early in January, was made possible through collaboration of the National Research Council,

War Department, Navy Department, United States Public Health Service, and the American Cancer Society.

Following are some highlights of the commission's report, which was reviewed and cleared by the Atomic Energy Commission prior to issuance:

"Members of the commission have been impressed during their observations of atomic bomb survivors by the fact that many of the burns have healed with accumulations of large amounts of elevated scar tissue, the so-called keloids," said the report.

"The striking feature noted is the large number of burns that have healed with excessive quantities of scar tissue, having a relatively flat surface elevated above that of surrounding skin. Margins of these lesions are sharply defined. The area involved varies very much, some being as small as one centimeter in diameter while others may involve most of the face or the back. The maximum growth of such tissue evidently was reached about eight to ten months following the injury . . . . These are the so-called keloids."

"The assay of possible genetic effects is much more readily performed in plant and animal material than in man with, however, the important qualification that in man and, to a lesser extent, plant material, it is often impossible to be certain of position at the time of the bombing," says the report. "The Japanese efforts to utilize animal material have been completely nullified by the chaotic conditions and poor food situation."

Experiments with Drosophila fruit flies also had to be abandoned for lack of facilities and adequate testor stocks. With respect to plant material studies, the Japanese made certain observations purporting to show that vegetables grown in Nagasaki from seed from plants that were well beyond the known radius of bomb effects tended to assume unusual forms when grown near the ground center of the explosion. Dr. Takeo Furuno, noted horticulturist, maintained two experimental garden plots, one 150 M. and the other 500 M. from the hypocenter. Abnormal vegetative forms of Brassica chinensis, Lappa edulis, Cucuroita moschata, Solanum melongena and other species were reported to be far more frequent in the plot nearest the hypocenter, attributable to some effect of the atomic bombing on the soil.

"These two plots were inspected," says the Brues-Henshaw report, "and specimens of the vegetables examined. It was the opinion that soil differences complicate the picture to an extent where it is impossible to reach conclusions."

During the months of October and November, 1945, a study was conducted on 124 male inhabitants of Hiroshima. Examinations disclosed that in 43 cases, the number of spermatocytes in the ejaculated sperm was less than 5,000 per cubic millimeter, or "absolutely sterile," in the words of Professor Tsuzuki. Ten other cases were "relatively sterile" and the remaining 71 were normal.

"A reformation of the spermatocytes occurs in one month, so the recovery of damage to spermatocyte formation will be delayed more than that of the damage of white blood cells. The shorter the distance, the more severe was the damage. The damaging influence on the number of spermatocytes was observed in the area within a radius of three kilometers (about two miles) from the ground center. Within a radius of 2.5 kilometers there appeared some sterile cases. Within a radius of 1.5 kilometers one-half of the cases showed sterility."

Women who were in an early stage of pregnancy "have taken a normal course since the bombing," said Dr. Tsuzuki.

"It is already experimentally proved both in botany and zoology that there is a possibility of producing a malformation of descendants when the sexual cells are affected in some degree by radioactive energy. The question, if this fact is applicable to the human beings or not, will be made clear by further observations.

"We have already clear evidence that the human sexual cells are also affected by the atomic bomb injuries. There is a possibility of malformation of the descendants, if the sexual cells should be affected selectively, without any severe damage to the other organs or tissues.

"In the survey of spermatocytes, it was noticed that they decreased not only in their number but they showed also some structural abnormalities. This problem must be, therefore, taken up and carefully followed further."

Heretofore, conflicting figures have been presented on the number and character of casualties at Hiroshima and Nagasaki. Dr. Tsuzuki quotes the Hiroshima prefecture as estimating, nineteen days after the explosion, the dead at 46,185, the missing at 17,429; the severely injured at 19,691, slightly injured at 44,979, and other sufferers at 235,656. Six months after the catastrophe, the toll of dead and missing stood at 92,133, excluding the military dead. The total number of Hiroshima dead may be set at 100,000, according to the Japanese professor. The Nagasaki prefecture set that city's toll at 23,753 dead, 1,924 missing, 23,345 wounded, and 89,025 other sufferers.

"Comparing the death rates of males and females, we find they are almost equal outside a radius of 1.5 kilometers from the ground center, but the rate of females within a radius of 1 kilometer seems to be lower than that of males. While we were staying at Hiroshima, we often heard that under the same conditions men died more quickly, women were more resistant. We could not believe such a story at that time.

"But the statistics showed a result that in the central area the female mortality seemed to be a little lower than the male. The reason for this fact is, of course, unknown. The central area, within a radius of 1 kilometer, was the place in which a tremendous number of neutrons reacted. We may be allowed to imagine that a difference of distribution of the atomic energies would cause the difference in the death rates between males and females."

The Atomic Bomb Casualty Commission report says:

"The commission's view that much valuable information can be obtained from a long-term study of atomic bomb casualties has been strengthened. . . . From previous irradiation experiences with both animals and human beings, there is good reason to believe that reproductive disturbances, malignancies of one form or another, shortened life span, altered genetic pattern, etc, will in time appear in greater or lesser degrees.

"The problem is one of detecting the changes and recording the events as they occur. It is the view of the commission, furthermore, that with the possible exception of genetic recessives (physical monstrosities which might not crop out for several generations), the various changes can be successfully detected and recorded. This presupposes, of course, the proper cooperation with the Japanese and a reasonable expenditure of funds."

Notes of Interest

Irwin Steuer, D.D.S., announces the removal of his office to 405 North Bedford Drive, Beverly Hills, California, practice limited to orthodontics.

Dr. James L. Wilson, Jr., 907 Reibold Building, Dayton 2, Ohio, has taken over the practice of the late Dr. Herbert L. Dershem, practice limited to orthodontics.

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The AMERICAN JOURNAL OF ORTHODONTICS AND ORAL SURGERY is the official publication of the American Association of Orthodontists and the following component societies. The editorial board of the AMERICAN JOURNAL OF ORTHODONTICS AND ORAL SURGERY is composed of a representative of each one of the component societies of the American Association of Orthodontists.

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In the January issue each year, the AMERICAN JOURNAL OF ORTHODONTICS AND ORAL SURGERY will publish a list of all of the orthodontic societies in the world of which it has any record. In addition to this, it will publish the names and addresses of the officers of such societies.